Utica Marcellus Texas Pipeline LLC
a Kinder Morgan company

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

February 12, 2015

Lee Anne Divine, Chief
U.S. Army Corps of Engineers
Louisville District
P.O. Box 59
Louisville, KY 40201-0059

Re: Nationwide Permit 12 Pre-Construction Notification
Tennessee Gas Pipeline Company, L.L.C. – Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC – Utica Marcellus Texas Pipeline Project
(State of Kentucky)

Dear Ms. Divine,

Tennessee Gas Pipeline Company, L.L.C. ("Tennessee") and Utica Marcellus Texas Pipeline LLC ("UMTP") are seeking authorization to construct the proposed Abandonment and Capacity Restoration Project ("ACRP") and the Utica Marcellus Texas Pipeline Project ("UMTP Project") under Nationwide Permit ("NWP") 12 for Utility Line Activities. The ACRP and UMTP Project will involve crossing a Section 10 river and unavoidable impacts to Waters of the United States ("WOUS"). Therefore, submittal of a Pre-Construction Notification ("PCN") to the U.S. Army Corps of Engineers ("USACE") District Engineer is required. This letter is intended to initiate the required PCN and provides supporting materials in accordance with the State of Kentucky Regional Conditions for NWP 12 and NWP General Condition 27(b). Tennessee and UMTP acknowledge that the wetlands and waterbodies crossed by the ACRP and UMTP Project may be jurisdictional WOUS. Therefore, Tennessee and UMTP request that the NWP 12 review and authorization be based on a preliminary Jurisdictional Determination (Attachment 1, Request for Preliminary Jurisdictional Determination).

NWP 12 PCNs are being submitted to all USACE Districts having jurisdiction over the proposed Projects. This includes the following USACE Districts:

Pittsburgh District	Huntington District	Louisville District
Memphis District	Nashville District	Vicksburg District
Fort Worth District	Galveston District	

Tennessee and UMTP are jointly submitting this application to your agency for proposed construction activities related to the two Projects within your office's service area. Because these two Projects have overlapping construction activities in some areas within your office's service area, the application covers both Projects. In early correspondence and meetings, these Projects were discussed jointly as the UMTP Project, a joint venture between Kinder Morgan Energy Partners, L.P. and MarkWest Utica EMG, L.L.C. Since these early contacts, the project proponents have

changed to include only Tennessee and UMTP. A description of each Project is described below and is illustrated on the attached ACRP and UMTP Project Overview map:

Tennessee – ACRP

- **Project Description** – In its ACRP, Tennessee proposes to abandon gas service and transfer by sale to an affiliate, UMTP, approximately 964 miles of one of Tennessee's existing 100/200 Line pipelines from at or near Main Line Valve ("MLV") 216 in Columbiana County, Ohio, to Station 40 in Natchitoches Parish, Louisiana (the "Existing Pipeline Segment"). The Existing Pipeline Segment will be used by UMTP to transport natural gas liquids ("NGLs") from supply sources in the Utica and Marcellus shale regions to Mt. Belvieu, Texas. The proposed abandonment of the Existing Pipeline Segment would result in a reduction in North-to-South capacity along Tennessee's 100/200 Line of approximately 270,000 Dth/day, which Tennessee proposes to restore by: (i) installing four new mid-point compressor stations, all in Ohio; (ii) adding additional compression at Station 110; (iii) adding additional compression at a compressor station proposed to be constructed as part of Tennessee's Broad Run Expansion Project; (iv) installing approximately 7.6 miles of 36-inch pipe near MLV 111 in Lewis/Carter Counties, Kentucky; (v) certain modifications to crossovers and taps; and (vi) certain other minor pipe replacement work (collectively, the "Restoration Work"). Tennessee anticipates that, with appropriate regulatory authorizations, Tennessee will be able to complete the Restoration Work and transfer the Existing Pipeline Segment to UMTP by late 2017.

UMTP – UMTP Project

- **Project Description** – UMTP is pursuing a new Project to transport NGLs from certain processing facilities in Ohio, Pennsylvania, and West Virginia to the Gulf Coast. As part of its UMTP Project, UMTP proposes to purchase from its affiliate, Tennessee, the interstate natural gas pipeline, which is currently subject to the jurisdiction of the Federal Energy Regulatory Commission ("FERC"), and which spans approximately 964 miles from at or near Tennessee's MLV 216 in Columbiana County, Ohio, to Tennessee's existing Station 40 in Natchitoches Parish, Louisiana. As soon as reasonably practicable following Tennessee's receipt of the FERC's authorization to abandon the Existing Pipeline Segment, which such authorization Tennessee will pursue as part of its ACRP, UMTP will convert the Existing Pipeline Segment to NGL service. The UMTP Project will also include: (i) the construction of approximately 160 miles of greenfield lateral/collector lines in Ohio, Pennsylvania, and West Virginia; and (ii) the construction of approximately 202 miles of greenfield pipeline from the terminus of the Existing Pipeline Segment in Natchitoches Parish, Louisiana, to Mont Belvieu, Texas.

Within the USACE Louisville District, Tennessee and UMTP propose construction of pipeline facilities listed in Table 1.

Table 1. Summary of Construction Activities in the USACE Louisville District

Construction Activity	Project	Total Count	Total Mileage
Construction Workspaces	ACRP	2	NA
	UMTP & ACRP	24	NA
Station Gaps	UMTP	1	NA
Off-ROW Tap Reconnects	UMTP & ACRP	2	2.16
New Compressors at Existing Compressor Stations	ACRP	2	NA
New Pump Stations	UMTP	6	NA
New NGL Main Line Valves	UMTP	4	NA
Conversion Pipeline Horizontal Directional Drill (HDD) Workspaces	UMTP & ACRP	2	NA

NA-Not Applicable

Based on the wetland delineation, minimal permanent loss and temporary impacts to wetlands and waterbodies are anticipated for the ACRP and UMTP Project in the USACE Louisville District. These impacts are summarized in Table 2.

Table 2. Summary of Impacts to WOUS in the USACE Louisville District

WOUS Type	Temporary Impact (acres)	Temporary Impact (linear feet)	Permanent Loss (acres)	Permanent Loss (linear feet)	Permanent Conversion to Emergent Wetland (acres)
Perennial Stream	0.00	0.00	0.00	0.00	NA
Intermittent Stream	0.00	0.00	0.05	670.91	NA
Ephemeral Stream	0.00	0.00	0.00	0.00	NA
Forested Wetland	0.00	NA	0.00	NA	0.00
Scrub-Shrub Wetland	0.00	NA	0.00	NA	0.00
Palustrine Emergent Wetland	0.11	NA	0.08	NA	NA
Other Waterbody (pond, etc.)	0.06	NA	0.28	NA	NA

NA-Not Applicable

None of the impacts associated with a single and complete project within the USACE Louisville District will result in greater than 0.50-acre loss of WOUS. Therefore, no individual permits are anticipated. Mitigation may be required as discussed in the PCN Attachment 2.

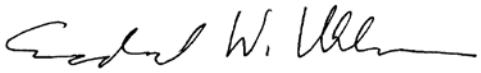
Tennessee and UMTP respectfully request your office review the enclosed information and provide written authorization to construct the proposed ACRP and UMTP Project under authorization of NWP 12. The contact information for project representatives is as follows:

Consulting agent:

Mr. Bruce Jones
Stantec Consulting Services Inc.
2321 Club Meridian Drive, Suite E
Okemos, MI 48864
Cell: 517-512-4288
bruce.jones2@stantec.com

Thank you for your consideration. We look forward to working with you on these Projects.

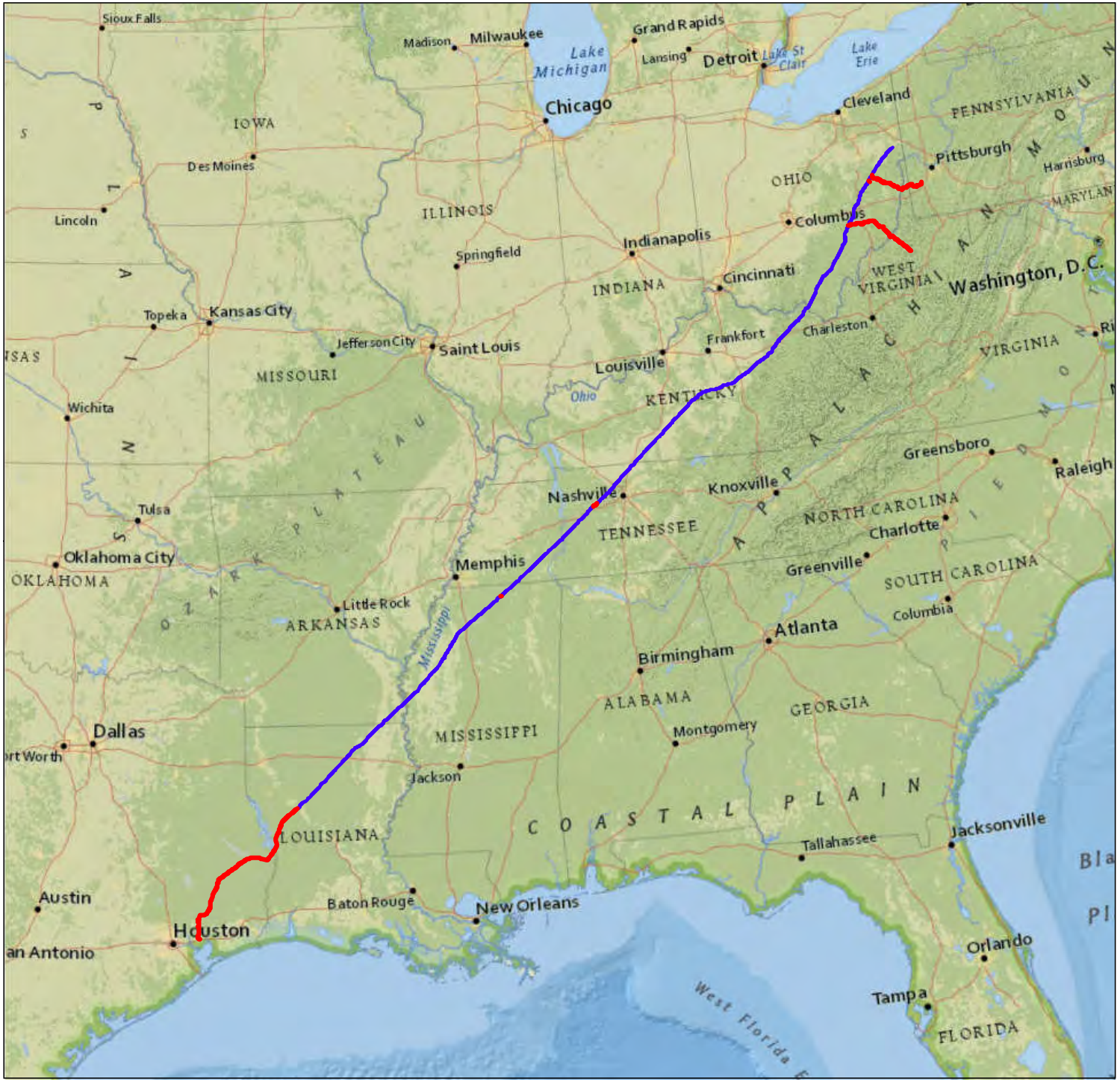
Sincerely,



Ted Uhlemann
Project Permitting
Kinder Morgan
370 Van Gordon Street
Lakewood, CO 80228
Office: 303-914-7806
Ted_Uhlemann@kindermorgan.com

CC: Bruce Jones, Stantec Consulting Services Inc.

Attachments: ACRP and UMTP Project Overview Map
Pre-construction Notification including Attachments 1 through 7



Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

Project Overview Map

Title

Abandonment & Capacity Restoration Project
Utica Marcellus Texas Pipeline Project

Client/Project

Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location

Pennsylvania, Ohio, West Virginia, Kentucky, Tennessee, Mississippi, Arkansas, and Louisiana

Prepared by AB on 2015-01-22
Technical Review by MP on 2015-01-22
Independent Review by BJ on 2015-01-22

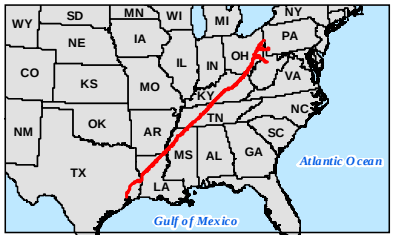
0 75 150 Miles

1:9,504,000 (At Original document size of 8.5x11)

N

Legend

- Abandonment & Capacity Restoration Project (ACRP)
- Utica Marcellus Texas Pipeline Project (UMTP)



Notes
1. Coordinate System: NAD 1983 Contiguous USA Albers
2. Data Sources include: Kinder Morgan, HMM, Stantec, Esri
3. Background: National Geographic

USACE Louisville District Nationwide Permit 12 Pre-Construction Notification

Tennessee Gas Pipeline Company, L.L.C.: Abandonment and Capacity Restoration Project

Utica Marcellus Texas Pipeline LLC: Utica Marcellus Texas Pipeline Project

Stantec Consulting Services Inc.

TRC Environmental Corporation

Prepared for:
U.S. Army Corps of Engineers
Louisville District
P.O. Box 59
Louisville, KY 40201-0059

February 12, 2015

TABLE OF CONTENTS

Attachment 1 Request for Preliminary Jurisdictional Determination

Request for Preliminary Jurisdictional Determination

In accordance with the United States (U.S.) Army Corps of Engineers ("USACE") Regulatory Guidance Letter ("RGL") No. 08-02, dated June 26, 2008, Tennessee Gas Pipeline Company, L.L.C. ("Tennessee") and Utica Marcellus Texas Pipeline LLC ("UMTP") respectfully requests that the USACE provide a Preliminary Jurisdictional Determination ("PJD") for the portion of the Abandonment and Capacity Restoration Project ("ACRP") and the Utica Marcellus Texas Pipeline Project ("UMTP Project") encompassed by the USACE Louisville District. The information provided below indicates the Waters of the U.S. ("WOUS") determined to be present within the project area during wetland and waterbody delineations in 2013 and 2015. A detailed Wetland and Waterways Delineation Report is included in Attachment 4 of this Pre-construction Notification ("PCN"). A PJD form is included in Attachment 1. Information to be provided in the PCN includes the following:

Owner/Representative

Ted Uhlemann
Project Permitting
Kinder Morgan
370 Van Gordon Street
Lakewood, CO 80228
Office: 303-914-7806
Ted_Uhlemann@kindermorgan.com

Subject Property Information

Please see Attachment 4 for:

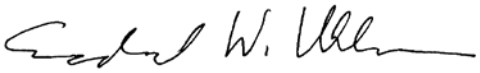
- Map set on aerial photo or the U.S. Geological Survey ("USGS") base showing:
  - Right-of-way ("ROW"); and
  - Delineated WOUS.

Delineated WOUS That Will Be Impacted

Please see Attachment 5 Wetland Delineation Report for:

- Table listing delineated WOUS with:
  - Unique feature names;
  - Stream names, if applicable;
  - Coordinates;
  - Wetland/stream type;
  - Stream length in ROW;
  - Area of stream/wetland in ROW in acres; and
  - Construction activity.

Sincerely,



Ted Uhlemann
Project Permitting
Kinder Morgan

Attachment 2 Project Information

A. APPLICANT

Ted Uhlemann
Project Permitting
Kinder Morgan
370 Van Gordon Street
Lakewood, CO 80228
Office: 303-914-7806
Ted_Uhlemann@kindermorgan.com

B. PROJECT LOCATION

In the USACE Louisville District, the proposed project route crosses through 15 counties within the USACE Louisville District, all within the state of Kentucky: Allen, Barren, Bath, Boyle, Clark, Garrard, Green, Hart, Madison, Marion, Montgomery, Powell, Rowan, Simpson, and Taylor . The Projects within the USACE Louisville District are located within the U.S. Fish and Wildlife Service ("USFWS") Southeast Region (Region 4).

Within linear pipeline corridors, construction will take place within a 50-foot wide permanent easement and in most areas with an additional 25-feet of temporary construction workspace. Additional temporary workspace will be required at major road and stream crossings, as well as horizontal directional drill ("HDD") locations and other crossings. Construction workspace will be reduced at wetland and stream crossings to help minimize potential impacts to these resources; any additional workspace required at wetland and stream crossings will be located in an upland area on either side of the feature, where practicable.

Proposed construction at discrete workspaces and other proposed facility locations will occur within defined areas typically ranging from 0.5-acre to 5-acres in area. These areas are located along an existing pipeline corridor within the USACE Louisville District.

Attachment 3 contains maps indicating the location of the Projects in more detail. Maps included in Attachment 3 also include Flood Insurance Rate Map ("FIRM") Flood Hazard Areas, where available, for locations where the Projects intersect delineated streams or open water.

C. PROJECT DESCRIPTION AND PURPOSE

Tennessee and UMTP are jointly submitting this application to your agency for proposed construction activities related to two projects within your office's service area. Because these two projects have overlapping construction activities in some

areas within your office's service area, the application covers both projects. In early correspondence and meetings, these projects were discussed jointly as the UMTP Project, a joint venture between Kinder Morgan Energy Partners, L.P. and MarkWest Utica EMG, L.L.C. Since these early contacts, the project proponents have changed to include only Tennessee and UMTP. A description of each project is described below:

Tennessee –ACRP

Project Description – In its ACRP, Tennessee proposes to abandon gas service and transfer by sale to an affiliate, UMTP, approximately 964 miles of one of Tennessee's existing 100/200 Line pipelines from at or near Main Line Valve ("MLV") 216 in Columbiana County, Ohio, to Station 40 in Natchitoches Parish, Louisiana (the "Existing Pipeline Segment"). The Existing Pipeline Segment will be used by UMTP to transport natural gas liquids ("NGLs") from supply sources in the Utica and Marcellus shale regions to Mt. Belvieu, Texas. The proposed abandonment of the Existing Pipeline Segment would result in a reduction in North-to-South capacity along Tennessee's 100/200 Line of approximately 270,000 Dth/day, which Tennessee proposes to restore by: (i) installing four new mid-point compressor stations, all in Ohio; (ii) adding additional compression at Station 110; (iii) adding additional compression at a compressor station proposed to be constructed as part of Tennessee's Broad Run Expansion Project; (iv) installing approximately 7.6 miles of 36-inch pipe near MLV 111 in Lewis/Carter Counties, Kentucky; (v) certain modifications to crossovers and taps; and (vi) certain other minor pipe replacement work (collectively, the "Restoration Work"). Tennessee anticipates that, with appropriate regulatory authorizations, Tennessee will be able to complete the Restoration Work and transfer the Existing Pipeline Segment to UMTP by late 2017.

UMTP – UMTP Project

Project Description – UMTP is pursuing a new project to transport NGLs from certain processing facilities in Ohio, Pennsylvania, and West Virginia to the Gulf Coast. As part of its UMTP Project, UMTP proposes to purchase from its affiliate, Tennessee, the interstate natural gas pipeline, which is currently subject to the jurisdiction of the Federal Energy Regulatory Commission ("FERC"), and which spans approximately 964 miles from at or near Tennessee's MLV 216 in Columbiana County, Ohio, to Tennessee's existing Station 40 in Natchitoches Parish, Louisiana. As soon as reasonably practicable following Tennessee's receipt of the FERC's authorization to abandon the Existing Pipeline Segment, which such authorization Tennessee will pursue as part of its ACRP, UMTP will convert the Existing Pipeline Segment to NGL service. The UMTP Project will also include: (i) the construction of approximately 160 miles of greenfield lateral/collector lines in Ohio, Pennsylvania, and West Virginia; and (ii) the construction of approximately 202 miles of greenfield pipeline from the

terminus of the Existing Pipeline Segment in Natchitoches Parish, Louisiana, to Mont Belvieu, Texas.

Within the USACE Louisville District, Tennessee and UMTP propose construction of pipeline facilities listed in Table 1.

Table 1. Summary of Construction Activities in the USACE Louisville District

Construction Activity	Project	Total Count	Total Mileage
Construction Workspaces	ACRP	2	NA
	UMTP & ACRP	24	NA
Station Gaps	UMTP	1	NA
Off-ROW Tap Reconnects	UMTP & ACRP	2	2.16
New Compressors at Existing Compressor Stations	ACRP	2	NA
New Pump Stations	UMTP	6	NA
New NGL Main Line Valves	UMTP	4	NA
Conversion Pipeline Horizontal Directional Drill (HDD) Workspaces	UMTP & ACRP	2	NA

NA-Not Applicable

D. CONSTRUCTION TECHNIQUES

Linear pipeline construction associated with the ACRP and UMTP Project will take place within a nominal 75-foot-wide construction ROW. The ROW constitutes the work limits of the Projects. Within wetland areas and at stream crossings the nominal construction ROW width will typically be reduced to 75-feet. The construction ROW will be cleared of vegetation and leveled as needed to provide a stable and safe work area. The limits of disturbance ("LOD") are synonymous with the limits of vegetation clearing. The small-diameter pipeline installation will utilize trench and backfill construction technique as illustrated in Attachment 6. Material will be excavated and backfilled along an approximately 4-foot wide trench through the wetland or stream. The pipeline will be installed per the minimum depth of cover required by the U.S. Department of Transportation ("DOT"), Pipeline and Hazardous Materials Safety Administration ("PHMSA").

Construction activities at discrete workspaces and other proposed facility locations as part of the ACRP and UMTP Project will occur within defined areas typically ranging from 0.5-acre to 5-acres in area. Vegetation will be cleared where

necessary within these areas to accommodate construction activities and new infrastructure. Erosion and sedimentation controls will be installed as appropriate between wetland, stream and open water resources and the construction activities.

Attachment 6 contains typical construction and restoration techniques proposed to be used for the Projects including typical plan view and cross-section drawings. These techniques are segregated by impact type (e.g., wetland or stream) and crossing technique (e.g., trench, dam and pump, HDD, etc.). Tennessee will follow the guidance provided in the FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan* ("Plan") and *Wetland and Waterbody Construction and Mitigation Procedures* ("Procedures"). UMTP will follow the guidance in the Kinder Morgan Construction Standards – Environmental Requirements (refer to Attachment 6). UMTP is a subsidiary of Kinder Morgan, Inc.

E. ENVIRONMENTAL EFFECTS

i. Direct Impacts

Direct impacts to WOUS will consist of temporary disturbance and permanent loss within the construction ROW. These impacts will be due to installation of the pipeline across the stream(s) or wetland(s) or impacts associated with various workspaces and other proposed facility locations that require modification of valves or other pipeline infrastructure. These workspaces and other proposed facility locations are at discreet locations along an existing pipeline corridor (see Attachment 3).

The broad categories of activities associated with the Projects that may have direct impacts include woody vegetation clearing, soil disturbances, construction-time erosion and sedimentation, temporary fill from construction timber mats, permanent fill, and short-term habitat modification.

Streams located in the ROW that are not crossed by the pipeline centerline and are not located in an area of proposed permanent loss will not result in permanent or temporary impacts to WOUS. These streams are included in the Waters Upload and Impacts Tables (Attachment 5), but do not list a proposed area of impact or linear crossing length.

For streams located in the ROW that are not crossed by the pipeline centerline:

- Streams with an ordinary high water mark ("OHWM") of less than 15-feet spanning the channel will be bridged to facilitate vehicle and equipment crossing. These bridges, typically constructed of timber mats, will be placed outside of the bed of the stream and constructed at an elevation to not impede anticipated stream flow during a rain event.

- Streams with an OHWM greater than 15-feet spanning the channel will be avoided in the ROW and sediment barriers installed outside of the stream banks to help prevent sediment from traveling off-ROW and into surface waters.

Streams that are crossed by the pipeline centerline will result in temporary impacts to WOUS only. The construction zone across a stream crossing will typically be up to a maximum of 16-feet wide. The construction zone constitutes all in-stream disturbances at a stream crossing, including excavation activities and the use of upstream and downstream temporary dams. Bridges and timber mats used to facilitate vehicle and equipment crossing at the stream will span both stream banks and may be located outside of the proposed construction zone, but within the ROW.

Temporary impacts at streams crossed by the pipeline centerline are calculated based on a 16-foot wide construction zone multiplied by the OHWM distance spanning the stream, also termed the pipeline crossing length of the stream. Refer to the stream crossing typicals for additional detail on temporary bridging and crossing methods (Attachment 6).

For streams that are crossed by the pipeline centerline with an OHWM greater than 15-feet spanning the channel, a culvert may be placed within the stream bed for temporary in-stream bridge support. This approximate 36-inch diameter by 10-foot long culvert may extend beyond the proposed 16-foot wide construction zone, depending on site conditions, but will be located entirely within the ROW.

ii. Indirect Impacts

The stream corridor(s) will be cleared of woody vegetation within the LOD. Non-forested and non-scrub-shrub wetlands will also be cleared of sparse woody vegetation. Where practicable, the LOD has been reduced within the ROW to avoid forested or scrub-shrub wetlands.

Long-term maintenance may require additional, periodic clearing of the ROW. Scrub-shrub and forested wetlands will be maintained in an emergent state over the width of the permanent easement (approximately 50-feet).

F. IDENTIFICATION OF WATERS OF THE U.S.

Wetland, stream and open water surveys were conducted between July 2013 and November 2014 by qualified wetland biologists from Stantec Consulting Services Inc. and TRC Environmental Corporation ("Stantec-TRC"). A complete Wetland and Waterbody Delineation Report for portions of the ACRP and UMTP Project within the USACE Louisville District is included in Attachment 4. Areas that landowners have not granted survey permission are noted in the Wetland and Waterbody Delineation Report figures as areas located outside of the Survey Corridor polygon. Prior to construction, supplemental information will be provided to the USACE that will detail any wetland, stream, and open water features that may be present on these properties.

Each delineated resource was given a unique identifier that included feature type, general location information, and a sequential identifying number (see Column B of the Waters Upload Table, Attachment 5). General locational information typically contained within the resource identifier includes the two-letter state abbreviation, a two-letter county abbreviation, the proposed workspace or facility name (e.g., for discrete workspaces or facility locations) or tract or parcel number (e.g., for new build linear corridor). Delineated wetlands were designated with "WL," streams were designated with "ST," and open water features were designated with "OW."

G. PROJECT IMPACTS

A summary table of the proposed impacts to WOUS for the ACRP and UMTP Project in the USACE Louisville District is provided in Table 2. Information in Table 2 is based on delineation of WOUS as indicated in the Wetland and Waterbody Delineation Report (Attachment 4), and the construction ROW information from project maps contained in Attachment 3.

Table 2. Summary of Project Impacts on Delineated WOUS in the USACE Louisville District

Total Number in ROW	Type[a]	Permanent Loss (acres)	Temporary Impact (acres)	Conversion to PEM (acres)
Wetlands				
4	PEM	0.08	0.11	NA
0	PSS	0.00	0.00	0.00
0	PFO	0.00	0.00	0.00
Waterbodies[b]				
1	Ephemeral	0.00	0.00	NA
3	Intermittent	0.05	0.00	NA
0	Perennial	0.00	0.00	NA
1	Open Water	0.28	0.06	NA

[a] Classification Definition: PEM - Palustrine Emergent Wetland
PSS - Palustrine Scrub-Shrub Wetland
PFO - Palustrine Forested Wetland

Ephemeral – An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round.

Intermittent – An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water.

Perennial – A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year.

Open Water – Palustrine Unconsolidated Bottom ("PUB"). Includes ponds, lakes, and other open bodies of water that are not streams or rivers and have maximum water depths greater than 1.5 meters.

[b] Streams that are located within the ROW but not crossed by the pipeline centerline will be avoided or bridged and will not result in permanent or temporary impacts on WOUS. Refer to the Waters Upload and Impacts Tables for additional detail (Attachment 5).

NA-Not Applicable

Survey permission from landowners was unavailable along portions of the ACRP and UMTP Project route during field surveys in 2013 and 2014. These areas are located outside of the tan boundary of the survey corridor noted on Figure 3 and are anticipated to be surveyed in the Spring of 2015. The results of these surveys will be provided to the USACE as an addendum to the PCN. To approximate additional potential impacts to WOUS prior to the completion of field surveys, National Wetland Inventory ("NWI") and the National Hydrography Dataset ("NHD") were reviewed to preliminarily identify potential WOUS present within the non-surveyed parcels. Table 3 provides a summary of these anticipated impacts of WOUS in non-surveyed areas based upon a review of the NWI and NHD data. These NWI and NHD features are not included in the Waters Upload and Impacts Tables provided in Attachment 5 as they are pending field verification. Permanent loss and temporary impact were not calculated for NHD-designated streams in Table 3 as the crossing width of these streams are unknown.

Table 3. Summary of Anticipated Project Impacts on Non-Delineated WOUS in the USACE Louisville District

Total Number in ROW	Type[a]	Permanent Loss (acres)	Temporary Impact (acres)	Conversion to PEM (acres)
NWI Wetlands				
0	PEM	0.00	0.00	NA
0	PSS	0.00	0.00	0.00
0	PFO	0.00	0.00	0.00
NHD Waterbodies[b]				
0	Ephemeral	TBD	TBD	NA
4	Intermittent	TBD	TBD	NA
3	Perennial	TBD	TBD	NA
0	Open Water	0.00	0.00	NA

[a] Classification Definition:
PEM - Palustrine Emergent Wetland
PSS - Palustrine Scrub-Shrub Wetland
PFO - Palustrine Forested Wetland

Ephemeral – An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round.

Intermittent – An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water.

Perennial – A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year.

Open Water – Palustrine Unconsolidated Bottom ("PUB"). Includes ponds, lakes, and other open bodies of water that are not streams or rivers and have maximum water depths greater than 1.5 meters.

[b] Streams that are located within the ROW but not crossed by the pipeline centerline will be avoided or bridged and will not result in permanent or temporary impacts on WOUS.

NA-Not Applicable
TBD-To Be Determined

i. Wetland Impacts

Approximately 0.08-acre of permanent wetland loss and 0.11-acre of temporary wetland impact from the construction of the ACRP and UMTP Project is proposed within the USACE Louisville District. The field surveys identified and delineated four wetlands, all of them palustrine emergent ("PEM") wetlands. Attachment 5 contains the Waters Upload and Impacts Tables required by the USACE Louisville District. The Waters Upload and Impacts Tables provide a list of the wetlands crossed by the proposed ACRP and UMTP Project including the acreage impacted of each wetland. Wetland boundaries were delineated in the field and analyzed using Geographic Information Systems ("GIS") technology. Impacted wetland acreages along the proposed ACRP and UMTP Project route

were calculated by overlaying the proposed construction work areas on the surveyed wetland boundaries.

Tennessee and UMTP will minimize potential impacts to wetlands by utilizing HDD methods where practicable, reducing the construction ROW width at wetland crossings, and by implementing mitigation and minimization measures in accordance with applicable permits. Wetlands crossed using open-cut methods will be restored to pre-construction conditions, as near as practical, following the installation of the pipeline, or other pipeline infrastructure at discrete workspaces.

ii. Stream and Open Water Impacts

The project field biologists identified four stream crossings within the proposed construction corridor, including one ephemeral and three intermittent streams. In addition, one body of open water is located within the construction ROW. A list of the streams affected by the proposed ACRP and UMTP Project is provided in Attachment 5 including the length of crossing and acreage impacted at each stream. Permanent loss of approximately 0.05-acre of intermittent stream and 0.28-acre of open water from the construction of the ACRP and UMTP Project is proposed within the USACE Louisville District.

If there is no flow at the time of crossing and no significant precipitation forecast for 48 hours, intermittent and ephemeral streams will be crossed using open-cut methods, otherwise a dry crossing method will be implemented.

The open-cut method of crossing will involve excavation of the pipeline trench across the stream, installation of a pre-fabricated segment of pipeline, and backfilling of the trench with native material. Excavation and backfilling of the trench will be accomplished using backhoes or other excavation equipment operating from one or both banks of the stream. Open-cut in-stream construction activities will be completed within 48 hours unless site specific conditions make completion within 48 hours infeasible. The stream banks will be returned to as near preconstruction conditions as practical. Tennessee and UMTP will minimize potential construction-related disturbance to the aquatic environment by implementing best management practices ("BMPs"). Additional construction method detail is provided in Section E.

H. WETLAND, STREAM AND OPEN WATER AVOIDANCE AND MINIMIZATION

Permanent facilities have been sited in uplands where practical to avoid wetland, stream, and open water resources. In addition to the 0.08-acre of permanent wetland loss, 0.11-acre of temporary wetland impact is proposed within the USACE Louisville District.

Within linear pipeline corridors, minimization of surface water feature impacts will include a reduction of the construction ROW width to typically 75-feet at wetland and perennial and intermittent stream crossings. This reduction in construction width will extend into the adjacent uplands for an additional 50-feet from the edge of the wetlands and ordinary high water mark of the stream. A 50-foot wide permanent easement will be maintained over wetlands, streams, and open water subsequent to completion of the pipeline construction. Details of construction areas are shown in Attachment 3 (Topographic Project Location Maps and Aerial Project Maps) and Attachment 6 (Typical Construction Drawings).

Temporary erosion control devices will be installed as necessary prior to and after initial disturbance of wetlands, streams, open water, or adjacent upland areas to help prevent sediment flow into aquatic resources and will be maintained until re-vegetation is complete, as determined by permit or landowner requirements (Attachment 6). Trench plugs will be installed as necessary through wetlands to help maintain wetland hydrology. The construction equipment operating in wetland areas will utilize timber mats to minimize surface impacts and will be limited to that needed to clear the construction ROW, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the construction ROW.

If required during construction, timber mats placed in wetlands will be removed following installation of the pipeline and restoration of the work area. Land surface contours will be restored as close as practicable to pre-construction conditions. Any required permanent erosion control measures will then be installed, and disturbed areas within the wetland will be temporarily stabilized with approved restoration seed mixes to protect the wetland soils from erosion. Wetland areas will be allowed to return to pre-construction wetland conditions through natural revegetation.

Vegetation management procedures during operation of the pipeline will be performed annually to maintain the permanent easement in an herbaceous state, as required to facilitate periodic corrosion and leak detection surveys as required by the U.S. Department of Transportation (DOT; Title 49).

I. COMPENSATORY MITIGATION

Tennessee and UMTP recognize that compensatory mitigation may be required for the unavoidable permanent loss of WOUS. Tennessee and UMTP will work closely with the USACE Louisville District to determine appropriate mitigation types and amounts.

J. FEDERALLY THREATENED AND ENDANGERED SPECIES

Section 7 (a)(2) of the Endangered Species Act ("ESA") requires federal agencies to ensure that their activities or authorizations are not likely to jeopardize the continued existence of listed species or adversely modify designated critical habitats. Accordingly, Tennessee and UMTP completed an assessment that included field surveys for potential threatened and endangered species ("TES") habitats.

Tennessee and UMTP are coordinating with the applicable USFWS regional field offices regarding TES. Because the proposed project activities will require federal permits, the Projects must be conducted in compliance with Section 7 of the ESA. Activities associated with the ACRP are regulated by the FERC. The FERC and other federal agencies with jurisdiction over these projects will make a formal determination on which agency will assume lead federal agency responsibilities.

Representatives of Tennessee, UMTP, and Stantec-TRC met with the Kentucky USFWS Ecological Field Office to introduce the Projects to the USFWS and discuss relevant ESA issues. Meeting notes were developed and provided to the USFWS Field Office designated contact for comment before finalizing for record. Meeting notes are included in Attachment 7.

The USFWS Field Office provided technical assistance letters regarding federally listed species potentially occurring within the State of Kentucky. This correspondence also includes measures to avoid or minimize impacts to species and their habitat. Correspondences are included in Attachment 7. Table 4 provides the USFWS Field Office representative and dates of project coordination.

Table 4. USFWS Project Contacts and Coordination Dates in the USACE Louisville District

USFWS Representative	Meeting Date	Correspondence Date
Kentucky – Jim Gruhala	October 29, 2013	June 2, 2014

K. CULTURAL AND HISTORICAL RESOURCES

Section 106 of the National Historic Preservation Act ("NHPA"), as amended, requires a federal agency to take into account the effect of its undertakings on any properties listed in, or eligible for listing in, the National Register of Historic Places ("NRHP"). Cultural surveys have been completed at proposed construction locations where survey permission was available. The Area of Potential Effects

("APE") surveyed for historic resources also included surrounding areas within line of sight of possible landscape changes associated with construction.

Tennessee and UMTP are coordinating with the applicable State Historic Preservation Offices ("SHPO") regarding cultural and historical resources. Because the proposed project activities will require federal permits, the Projects must be conducted in compliance with Section 106 of the NHPA. Activities associated with the ACRP are regulated by the FERC. The FERC and other federal agencies with jurisdiction over these projects will make a formal determination on which agency will assume lead federal agency responsibilities.

In the event any archeological sites or human remains are uncovered during construction, the permittee shall cease work immediately and contact the appropriate USACE District office, the County Sheriff's office (for human remains), and the applicable SHPO. The person making the discovery shall immediately cease any activity which may cause further disturbance, contact Tennessee and UMTP, and make a reasonable effort to protect the area from further disturbance.

Phase I cultural resource surveys have been completed for areas where landowner access was available. Survey reports for these surveys are being forwarded to the Kentucky Office of State Archaeology ("KYOSA") for their review.

As representatives of Tennessee and UMTP, Stantec-TRC emailed Ms. Kary Stackelbeck on May 22, 2014 of the KYOSA. The purpose of the email was to introduce the Projects to the KYOSA and discuss known significant cultural resources at or near the project work areas and survey protocol issues.

L. ADDITIONAL INFORMATION

The USACE Louisville District requires that all notifications of Nationwide Permits ("NWPs") shall be in accordance with NWP General Condition No. 31. General Conditions and Kentucky State NWP 12 Conditions are listed in Table 5 and Table 6, respectively.

Regarding NWP 12, activities that result in a loss of Outstanding State or National Resource Waters ("OSNRWs"), Exceptional Waters ("EWs"), Coldwater Aquatic Habitat Waters ("CAHs") and waters with Designated Critical Habitat ("DCH") under the Endangered Species Act for the NWPs listed below, a PCN will be required to the USACE. One CAH, the Dix River, is located within the project area and will be crossed using the HDD method.

In addition to the notification and agency coordination requirements in the NWPs, for impacts greater than 0.25-acre in all WOUS for the NWP 12 activities a PCN

will be required to the USACE. No temporary or permanent impacts greater than 0.5-acre are proposed for the ACRP and UMTP Project within the USACE Louisville District. This document constitutes Tennessee and UMTP's PCN.

Table 5. General Conditions for Water Quality Certification

1	The Kentucky Division of Water may require submission of a formal application for an Individual Certification for any project if the Projects have been determined to likely have a significant adverse effect upon water quality or degrade the waters of the Commonwealth so that existing uses of the water body or downstream waters are precluded.	No significant adverse effects are anticipated due to project activities.
2	Nationwide permits issued by the USACE for projects in Outstanding State Resource Waters, Cold Water Aquatic Habitats, and Exceptional Waters as defined by 401 KAR 10:026 shall require individual water quality certifications.	One Cold Water Aquatic Habitat pertains, the Dix River, which will be crossed by HDD.
3	Erosion and sedimentation pollution control plans and Best Management Practices must be designed, installed, and maintained in effective operating condition at all times during construction activities so that violations of state water quality standards do not occur.	Erosion and sediment control plans are provided in Attachment 6: Kinder Morgan Construction Standards: Environmental Requirements.
4	Sediment and erosion control measures (e.g., check-dams, silt fencing, or hay bales) shall not be placed within surface waters of the Commonwealth, either temporarily or permanently, without prior approval by the Kentucky Division of Water's Water Quality Certification Section. If placement of sediment and erosion control measures in surface waters is unavoidable, placement shall not be conducted in such a manner that may cause instability of streams that are adjacent to, upstream, or downstream of the structures. All sediment and erosion control measures shall be removed and the natural grade restored prior to withdrawal from the site.	Erosion and sediment control plans are provided in Attachment 6: Kinder Morgan Construction Standards: Environmental Requirements.
5	Measures shall be taken to prevent or control spills of fuels, lubricants, or other toxic materials used in construction from entering the watercourse.	Spill prevention and control plans are included in Attachment 6: Kinder Morgan Construction Standards: Environmental Requirements.

6	To the maximum extent practicable, all in-stream work under this certification shall be performed during low flow.	All in-stream work will be performed during low flow to the maximum extent practicable.
7	Heavy equipment (e.g. bulldozers, backhoes, draglines, etc.), if required for this project, should not be used or operated within the stream channel. In those instances where such in-stream work is unavoidable, then it shall be performed in such a manner and duration as to minimize re-suspension of sediments and disturbance to the channel, banks, or riparian vegetation.	In-stream work, if required, will be performed in such a manner and duration as to minimize re-suspension of sediments and disturbance to the channel, banks, or riparian vegetation.
8	If there are water supply intakes located downstream that may be affected by increased turbidity, the permittee shall notify the operator when work will be performed.	NA
9	Removal of existing riparian vegetation should be restricted to the minimum necessary for project construction.	Disturbance of riparian vegetation will be avoided or minimized to the extent practicable to complete construction.
10	Should stream pollution, wetland impairment, and/or violations of water quality standards occur as a result of this activity (either from a spill or other forms of water pollution), the Kentucky Division of Water shall be notified immediately by calling 800/564-2380.	Acknowledged

NA- Not Applicable

The Commonwealth of Kentucky certifies under Section 401 of the Clean Water Act ("CWA") that applicable water quality standards under Kentucky Administrative Regulations Title 401, Chapter 10, are in compliance for NWP 12 activities if the following conditions are met.

Table 6. General Conditions for Water Quality Certification

1	The activity will not occur within surface waters of the Commonwealth identified by the Kentucky Division of Water as Outstanding State or National Resource Water, Cold Water Aquatic Habitat, or Exceptional Waters.	One Cold Water Aquatic Habitat pertains, the Dix River, which will be crossed by HDD.

2	The Activity will not occur within surface waters of the Commonwealth identified as perpetually-protected (e.g., deed restriction, conservation easement) mitigation sites.	Perpectually protected sites will be avoided to the extent practicable**.**
3	The general water quality certification is limited to the crossing of surface waters by utility lines. This document does not authorize the installation of utility lines in a linear manner within the stream channel or below the top of the stream bank.	No facilities are proposed to be installed in a linear manner within the stream channel or below the top of the stream bank
4	For a single crossing, impacts from the construction and maintenance corridor in surface waters shall not exceed 50 feet of bank disturbance.	Impacts from construction and maintenance per single crossing will not exceed 50 feet where practicable.
5	This general certification shall not apply to nationwide permits issued for individual crossings which are part of a larger utility line project where the total cumulative impacts from a single and complete linear project exceed 1/2 acre of wetlands or 300 linear feet of surface waters. Cumulative impacts include utility line crossings, permanent or temporary access roads, headwalls, associated bank stabilization areas, substations, pole or tower foundations, maintenance corridor, and staging areas.	Impacts are not proposed to exceed 0.5-acre or 300 linear feet from a single and complete linear project.
6	Stream impacts under Conditions 4 and 5 of this certification are defined as the length of bank disturbed. For the utility line crossing and roads, only one bank length is used in calculation of the totals.	Acknowledged
7	Stream impacts covered under this General Water Quality Certification and undertaken by those persons defined as an agricultural operation under the Agricultural Water Quality Act must be completed in compliance with the Kentucky Agricultureal water Quality Plan ((KWQP).	Acknowledged
8	The Kentucky Division of Water may require submission of a formal application for an individual certification for any project if the Projects have been determined to likely have a significant adverse effect upon water quality or degrade the waters of the Commonwealth so that existing uses of the water body or downstream waters are precluded.	NA
9	Activities that do not meet the conditions of this General Water Quality Certification require an Individual Section 401 Water Quality Certification.	Acknowledged
10	Blasting of stream channels, eveu under dry conditions, is not allowed under this general water quality certification.	NA

11	Utility lines placed parallel to the stream shall be located at least 50-feet from an intermittent or perennial stream, measured from the top of the stream bank. The cabinet may allow construction within the 50-foot buffer if avoidance and minimization efforts are shown and adequate methods are utilized to prevent soil from entering the stream.	Acknowledged
12	Utility line stream crossings shall be constructed by methods that maintain flow and allow for a dry excavation. Water pumped from the excavation shall be contained and allowed to settle prior to re-entering the stream. Excavation equipment and vehicles shall operate outside of the flowing portion of the stream. Spoil material from the excavation shall not be allowed to enter the flowing portion of the stream.	Stream crossing methods are provided in Attachment 6: Kinder Morgan Construction Standards: Environmental Requirements.
13	The activities shall not result in any permanent changes in pre-contruction elevation contours in surface waters or wetlands or stream dimension, pattern or profile.	Contours and stream dimensions will be returned to original elevation, pattern and dimensions.
14	Utiltiy line activities which impact wetlands shall not result in conversion of the area to non-wetland status. Mechanized land clearing of forested wetlands for the installation or maintenance of utility lines is not authorized under this cetification.	0.08-acre of PEM and 0.28-acre of Open Water are slated for permanent loss. Clearing of forested wetland is not proposed
15	Activities qualifying for coverage under this General Water Quality Certification are subject to the following conditions: • Erosion and sedimentation pollution control plans and Best Management Practices must be designed, installed and maintained in effective operation condition at all times during construction activities so that violations of state water quality standards do not occur. • Sediment and erosion control measures, such as check-dams constructed of any material, silt fencing, hay bales, etc., shall not be placed within surface waters of the Commonwealth, either temporarily or permanently, without prior approval by the Kentucky Division of Water's Water Quality Certiffication Section. If placement of sediment and erosion control measures in surface waters is unavoidable, design and placement of temporary erosion control measures shall not be conducted in such a manner that may resoult in instability of streams that are adjacent to, upstream, or	Acknowledged

	downstream of the structures. All sediment and erosion consrol devices shall be removed and the natural grade restored within the completion tjimeline of the activities. • Measures shall be taken to prevent or control spills of fuels, lubricants, or other toxic materials used in construction from entering the watercourse. • Removal of riparian vegetation shall be limited to that necessary for equipment access. • To the maximum extent practicable, all in-stream work under this certification shall be performed under low-flow conditions. • Heavy equipment, e.g., bulldozers, backhowes, draglines, etc., if required for this project should not be used or operated within the stream channel. In those instances in which such in-stream work is unavoidable, then it shall be performed in such a manner and duration as to minimize turbidity and disturbance to substrates and bank or riparian vegetation. • Any fill shall be of such composition that it will not adversely affect the biological, chemical, or physical properties of the receiving waters and/or cause violations of water quality standards. If rip-rap is utilized, it should be of such weight and size that bank stress or slump conditions will not be created because of its placement. • If there are water supply intakes located downstream that may be affected by increased turbidity and suspended solids, the permittee shall notify the operator when such work will be done. • Should evidence of stream pollution or jurisdictional wetland impairment and/or violations of water quality standards occur as a result of this activity (either from a spill or other forms of water pollution), the Kentucky Division of Water shall be notified immediately by calling (800) 928-2380.	

NA-Not Applicable

M. OTHER CERTIFICATIONS OR APPROVALS

No other NWP(s), regional general permit(s), or individual permit(s) will be used or are intended to be used to authorize any part of the proposed resource crossings. Table 7 identifies other federal, state, and local permits and authorizations required for the ACRP and UMTP Project.

Table 7. List of Federal, State, and Local Permits for the ACRP and UMTP Project in the USACE Louisville District

Permit	Permitting Authority	Date Applied	Decision/Date
Federal			
Certificate of Public Convenience and Necessity under Section 7(b) of the Natural Gas Act	Federal Energy Regulatory Commission ("FERC")	Anticipated February 2015	Pending
Section 10 River and Harbors Act, Section 404 of Clean Water Act or Nationwide Permit ("NWP")	U.S. Army Corps of Engineers ("USACE")	Anticipated March 2015	Pending
Kentucky			
Section 401 Water Quality Certification ("WQC")	Kentucky Department of Environmental Protection ("KDEP")	Anticipated Spring 2015	Pending
General NPDES Permit for Discharges of Hydrostatic Test Water	KDEP	Anticipated Fall 2015	Pending
Authorization for Temporary Water Withdrawal	KDEP	Anticipated March 2016	Pending
Floodplain Construction Permit to Construct Across or Along a Stream	KDEP	Anticipated June 2015	Pending

N. PROJECT SCHEDULE

Pending receipt of required permits and regulatory approvals, construction is scheduled to begin in the Fall of 2015 with an anticipated in-service date of the ACRP by Fall 2016 and the UMTP Project by Fall 2017.

Attachment 3 Project Overview Maps

Figure 1

ACRP and UMTP Project – USACE Louisville District

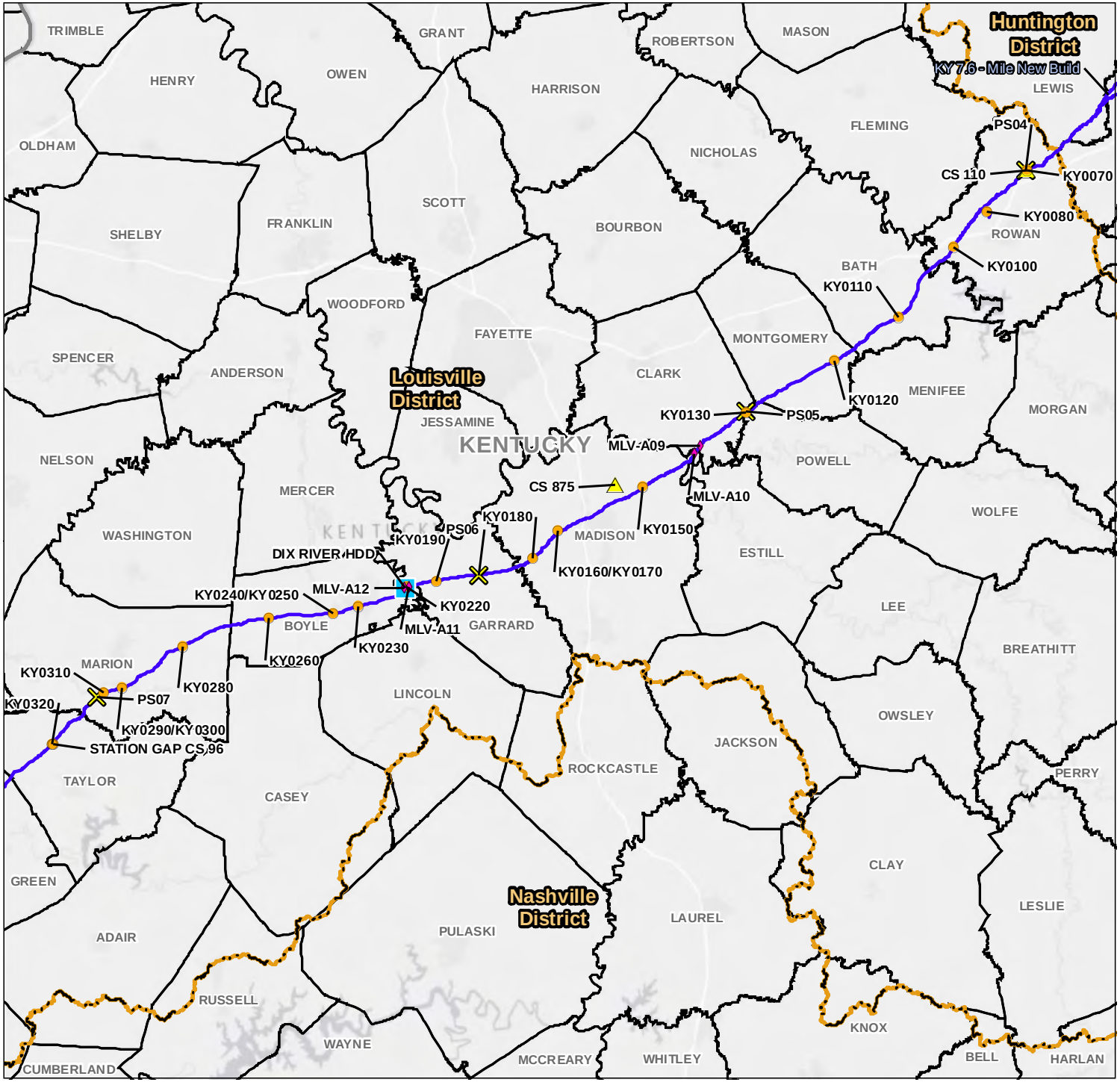


Figure No.
1

Title
Project Location Overview

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE: Louisville District

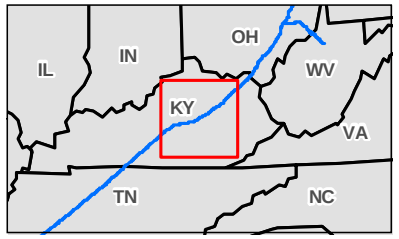
Prepared by KAS on 2015-01-22
Technical Review by MP on 2015-01-22
Independent Review by BJ on 2015-01-27

0 8 16 Miles
1:1,000,000 (At Original document size of 8.5x11)

N

Legend

- New NGL Mainline Valves
- Workspaces
- Compressor Stations
- New Pump Stations
- Horizontal Directional Drills
- Abandonment & Capacity Restoration Project (ACRP)
- Utica Marcellus Texas Pipeline Project (UMTP)
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, Esri
3. Background: ESRI

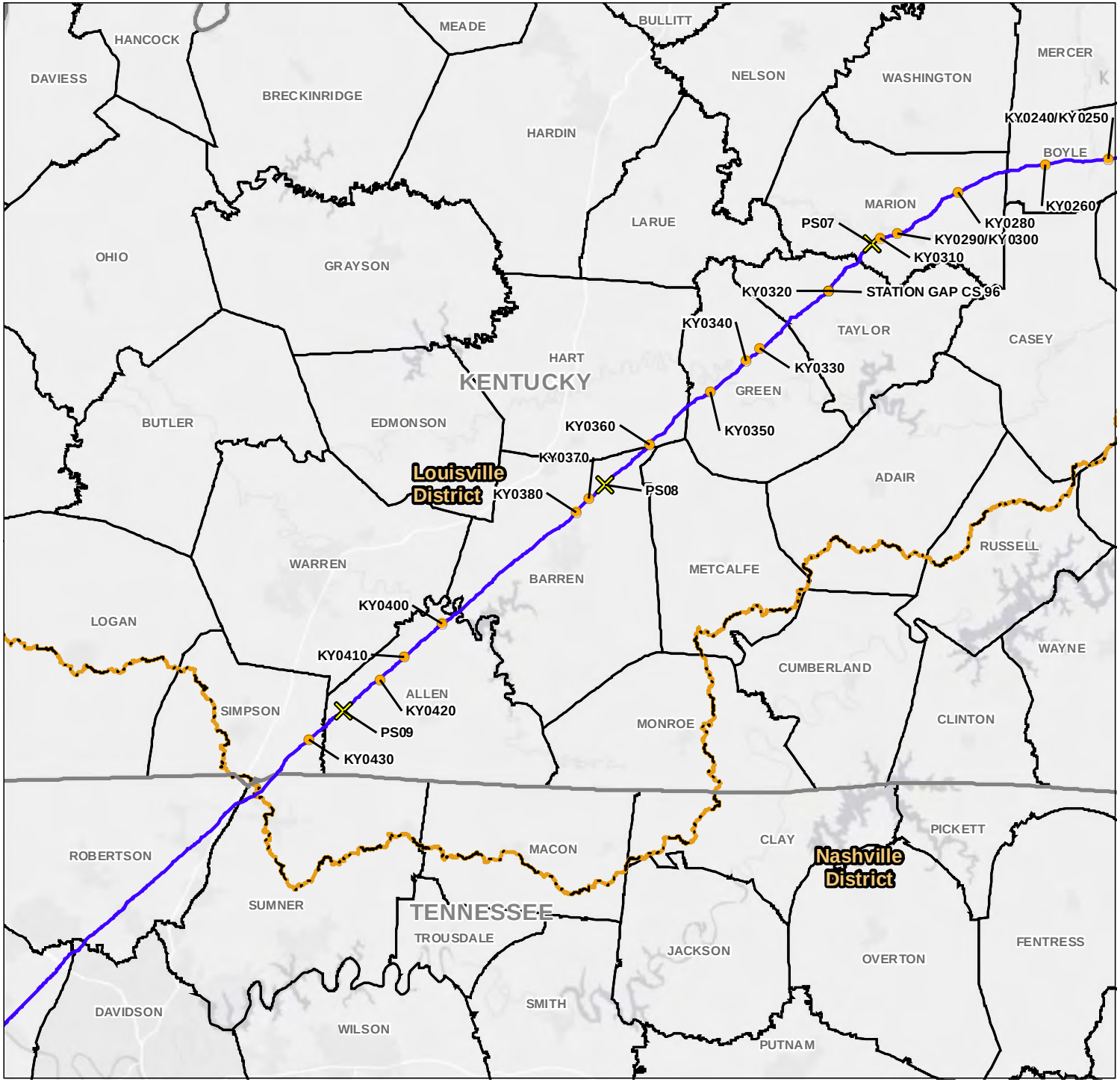


Figure No.
1

Title
Project Location Overview

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky and Tennessee
USACE: Louisville District

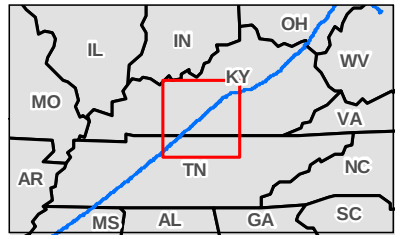
Prepared by KAS on 2015-01-22
Technical Review by MP on 2015-01-22
Independent Review by BJ on 2015-01-27

0 8 16 Miles
1:1,000,000 (At Original document size of 8.5x11)

N

Legend

- New NGL Mainline Valves
- Workspaces
- Compressor Stations
- New Pump Stations
- Horizontal Directional Drills
- Abandonment & Capacity Restoration Project (ACRP)
- Utica Marcellus Texas Pipeline Project (UMTP)
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, Esri
3. Background: ESRI

Figure 2

Project Location and Topography – USACE Louisville District

Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

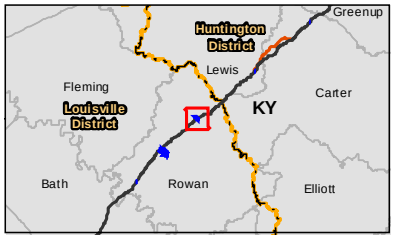
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 17S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

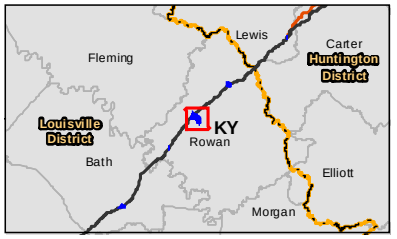
Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend

- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 17S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

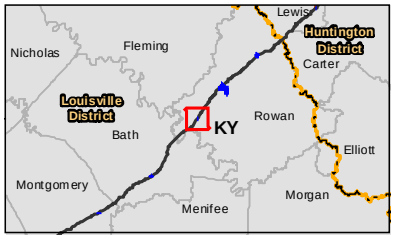
Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend

- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 17S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

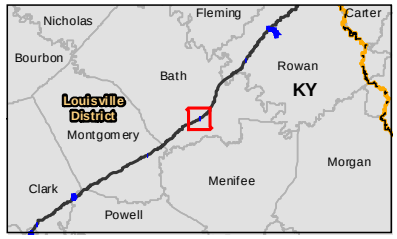
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 17S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

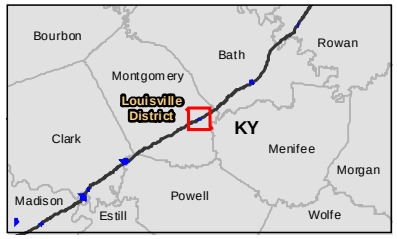
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 17S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

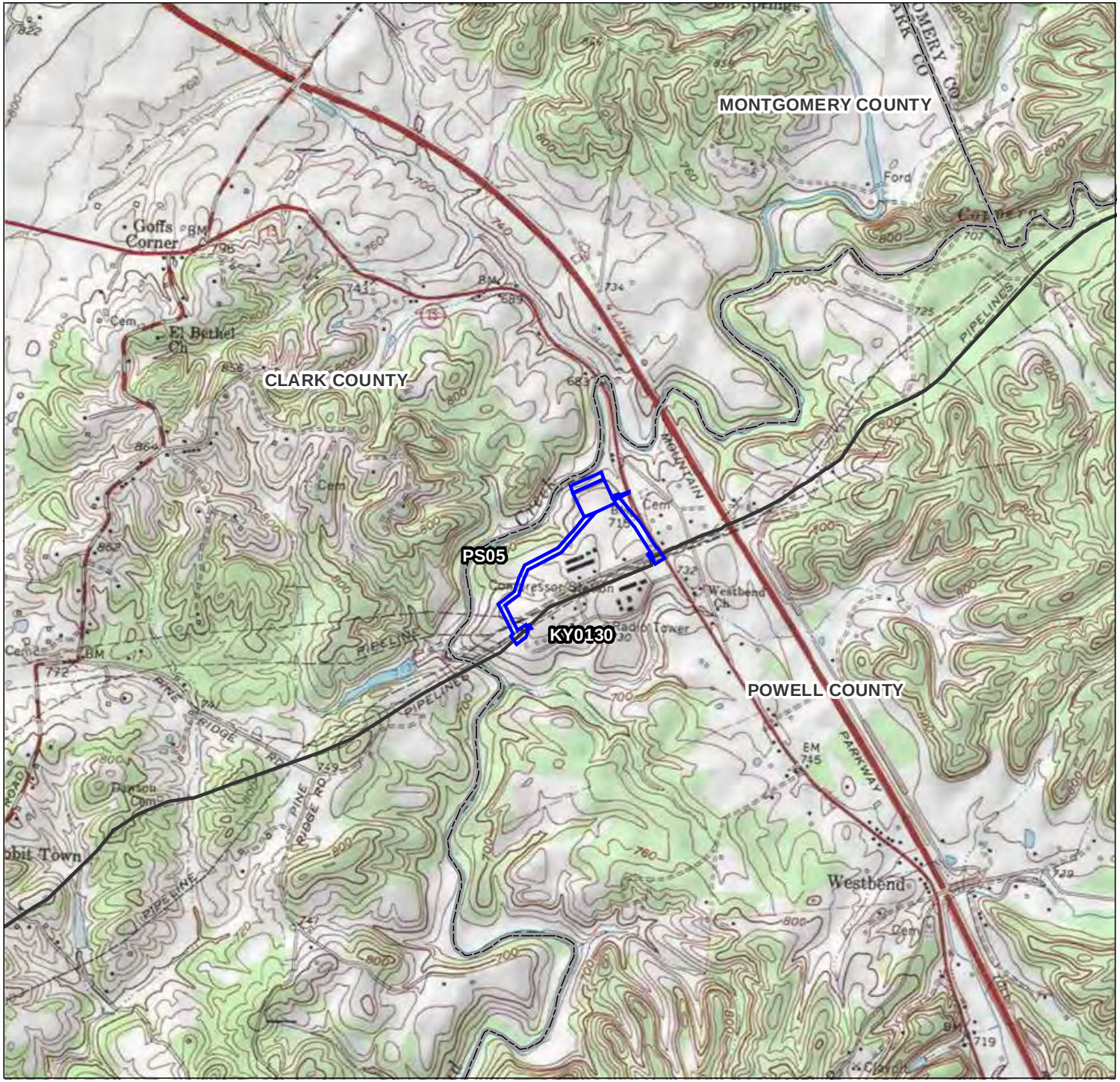


Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

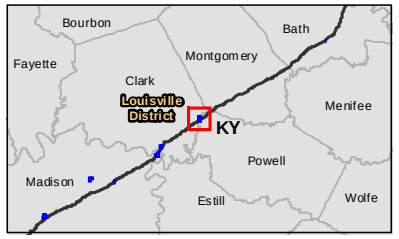
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 17S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

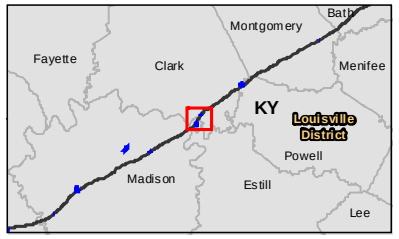
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

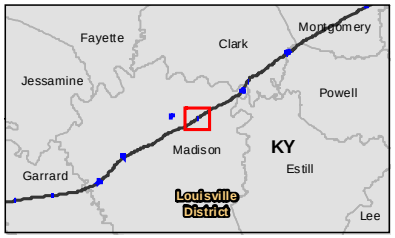
Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend

- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

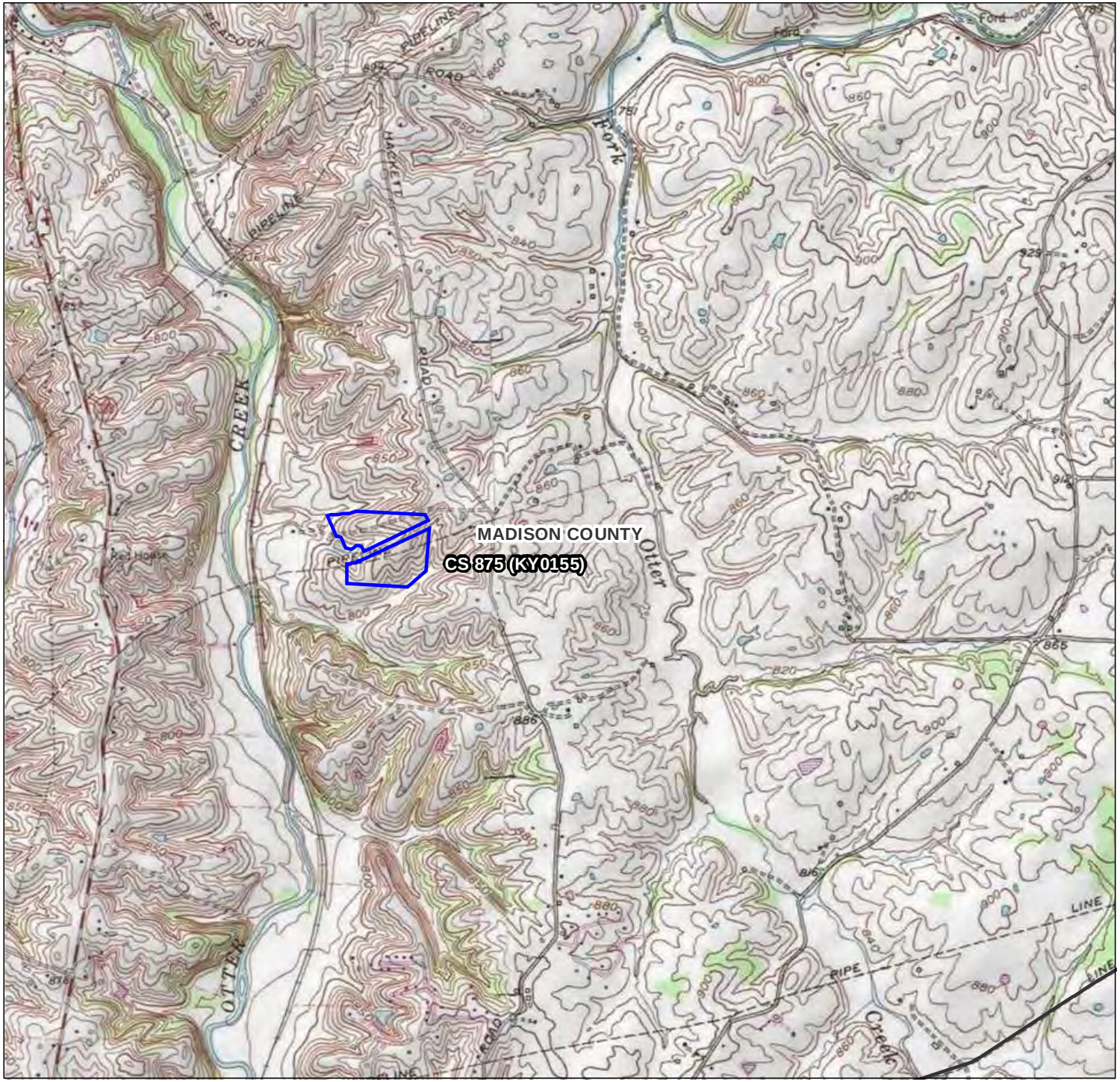


Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

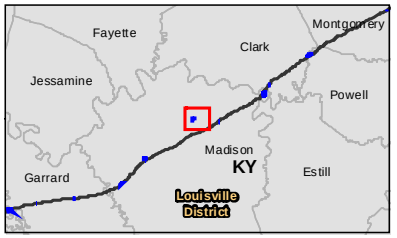
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

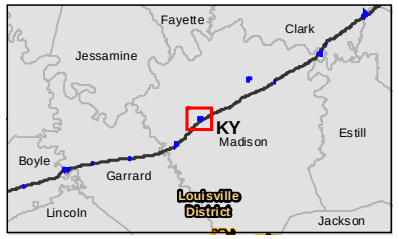
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

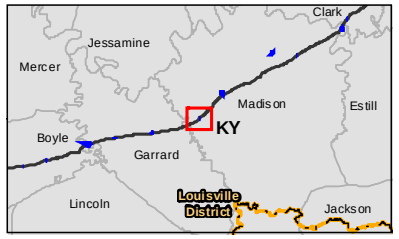
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

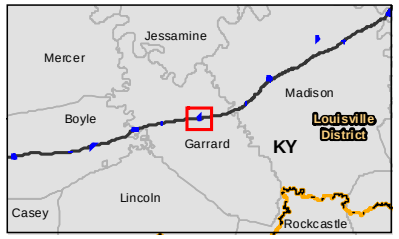
Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend

- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

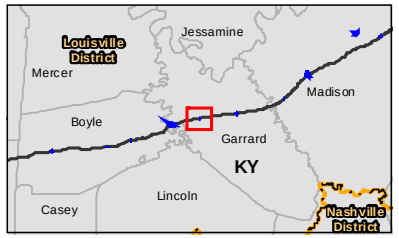
Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend

- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

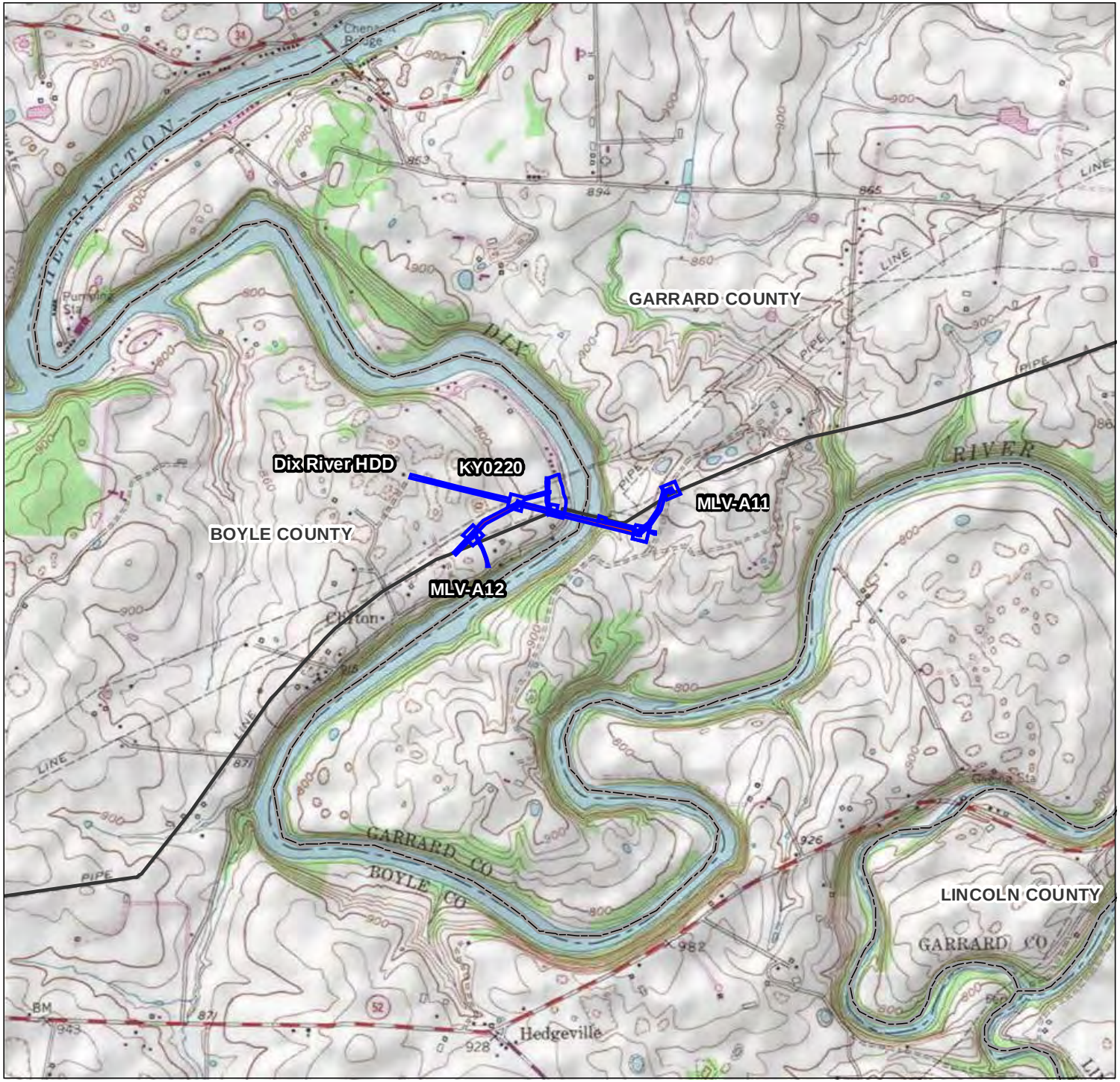


Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

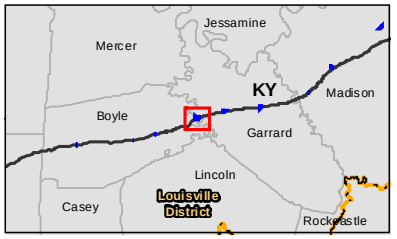
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

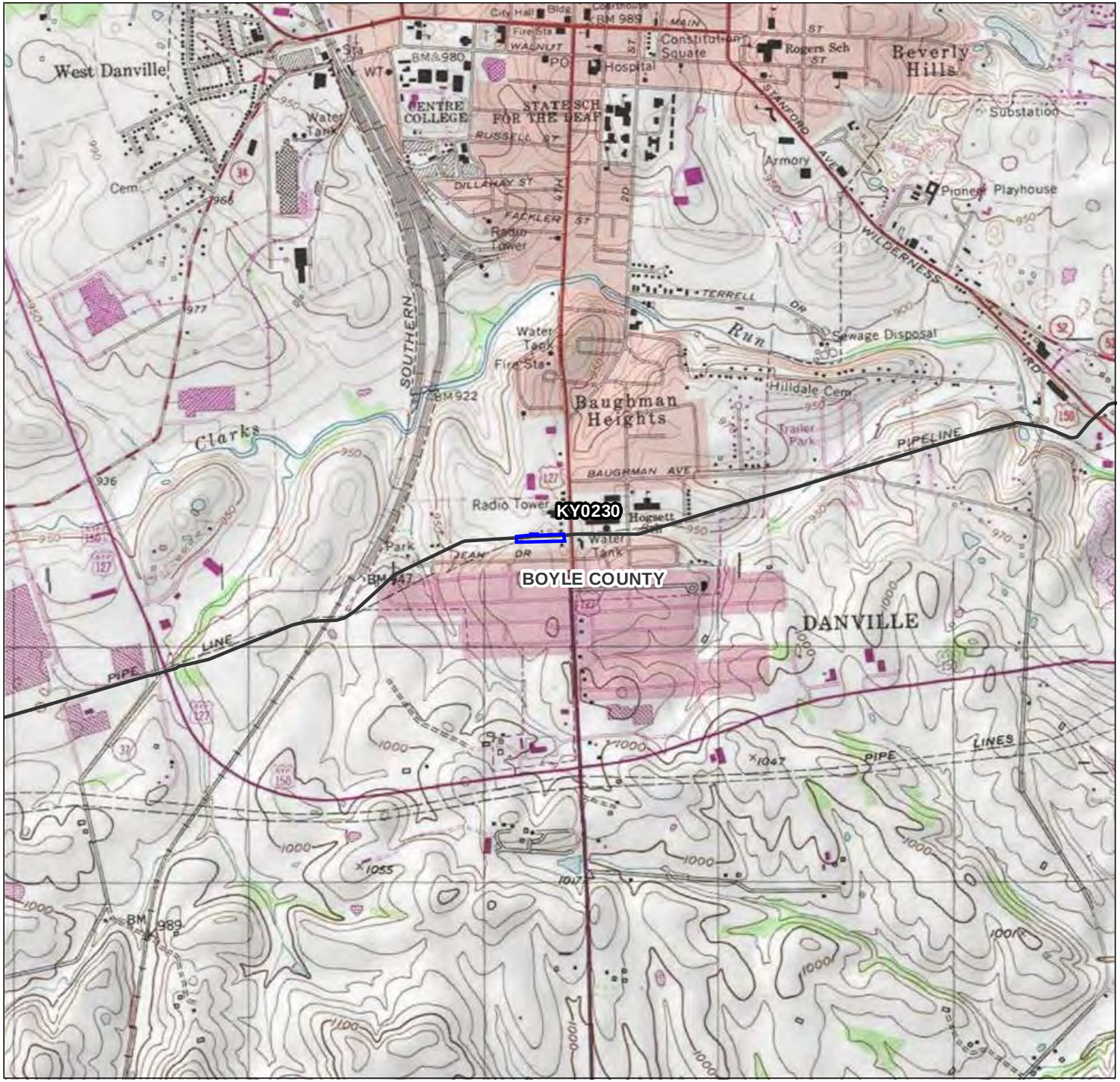


Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

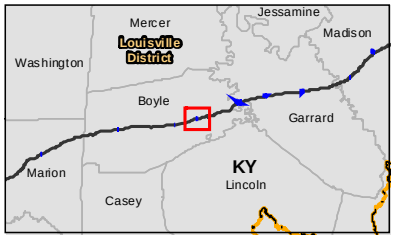
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

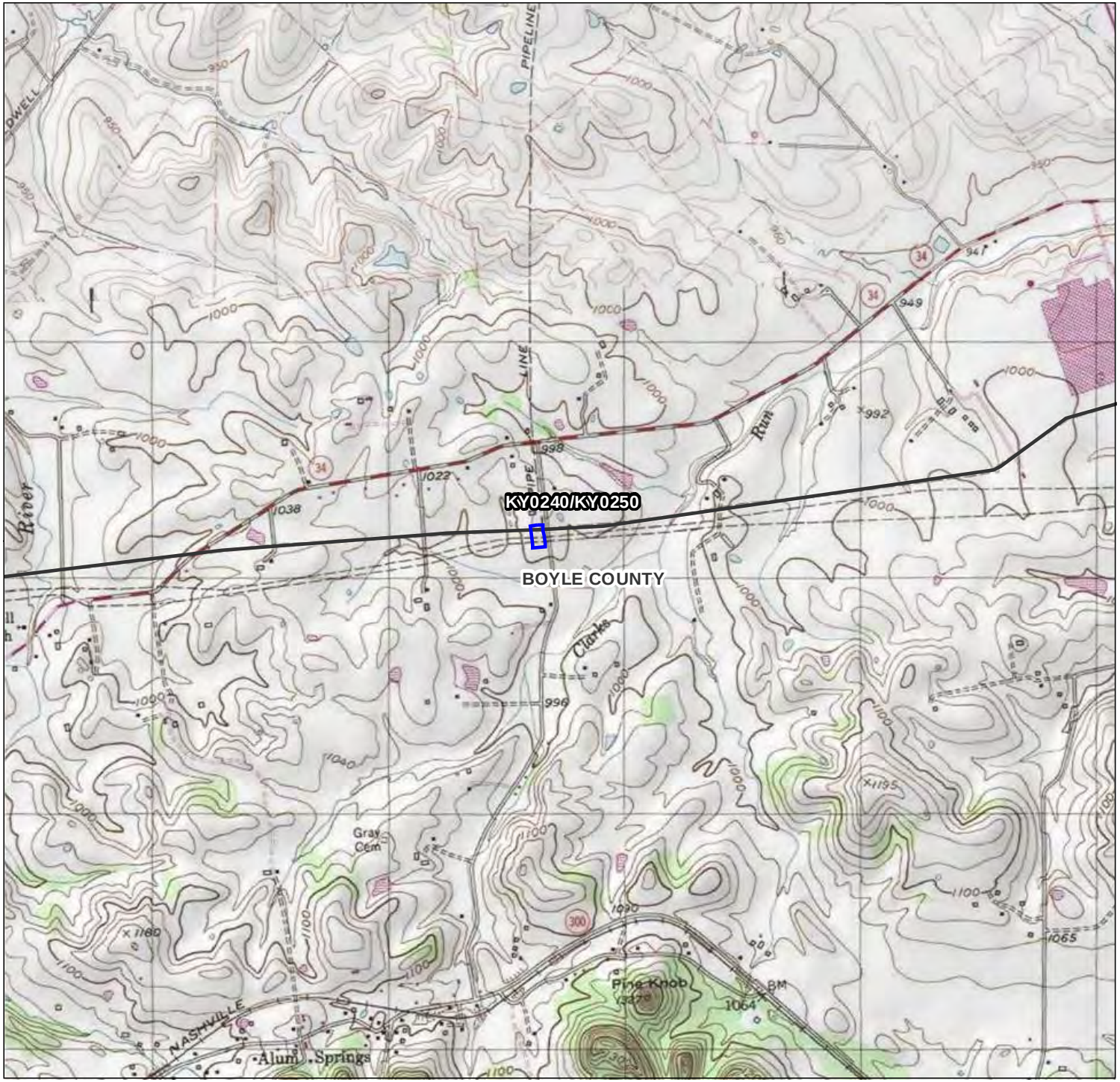


Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

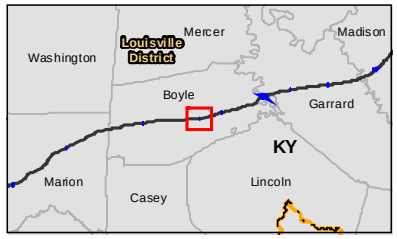
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

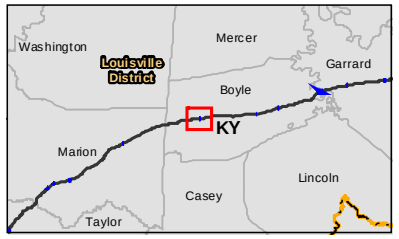
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

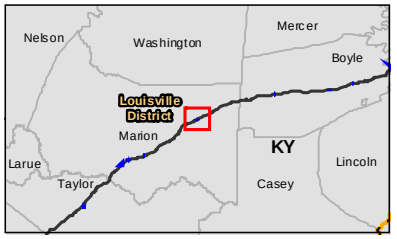
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

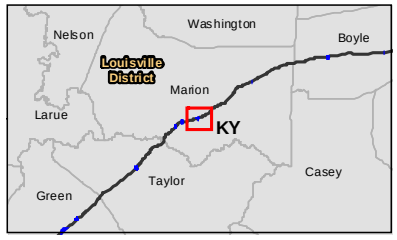
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

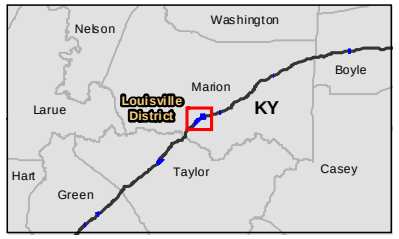
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

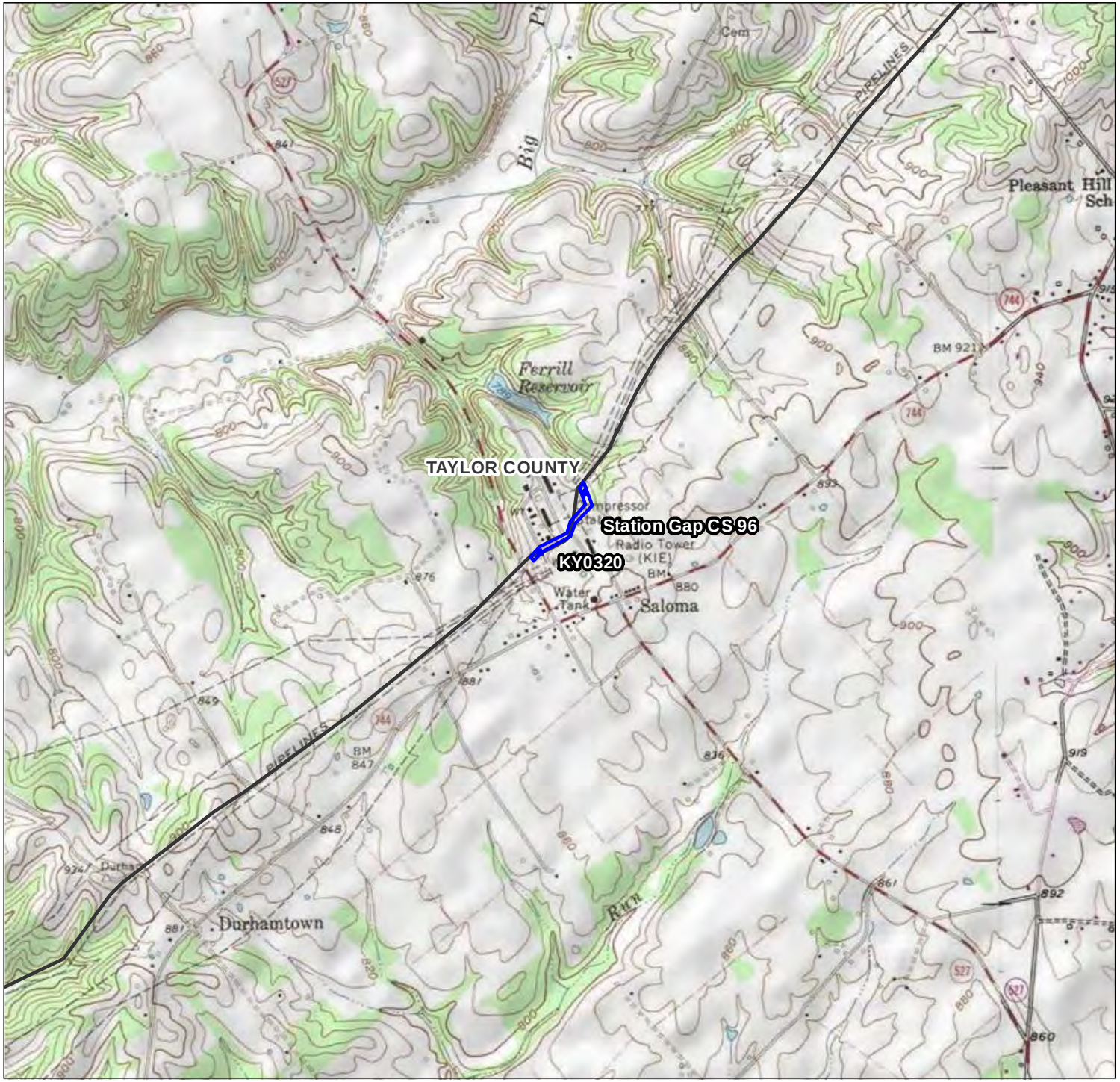


Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

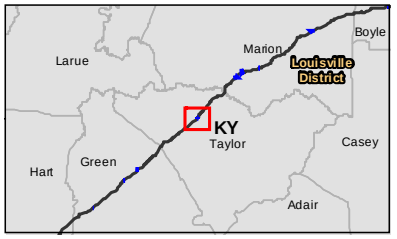
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

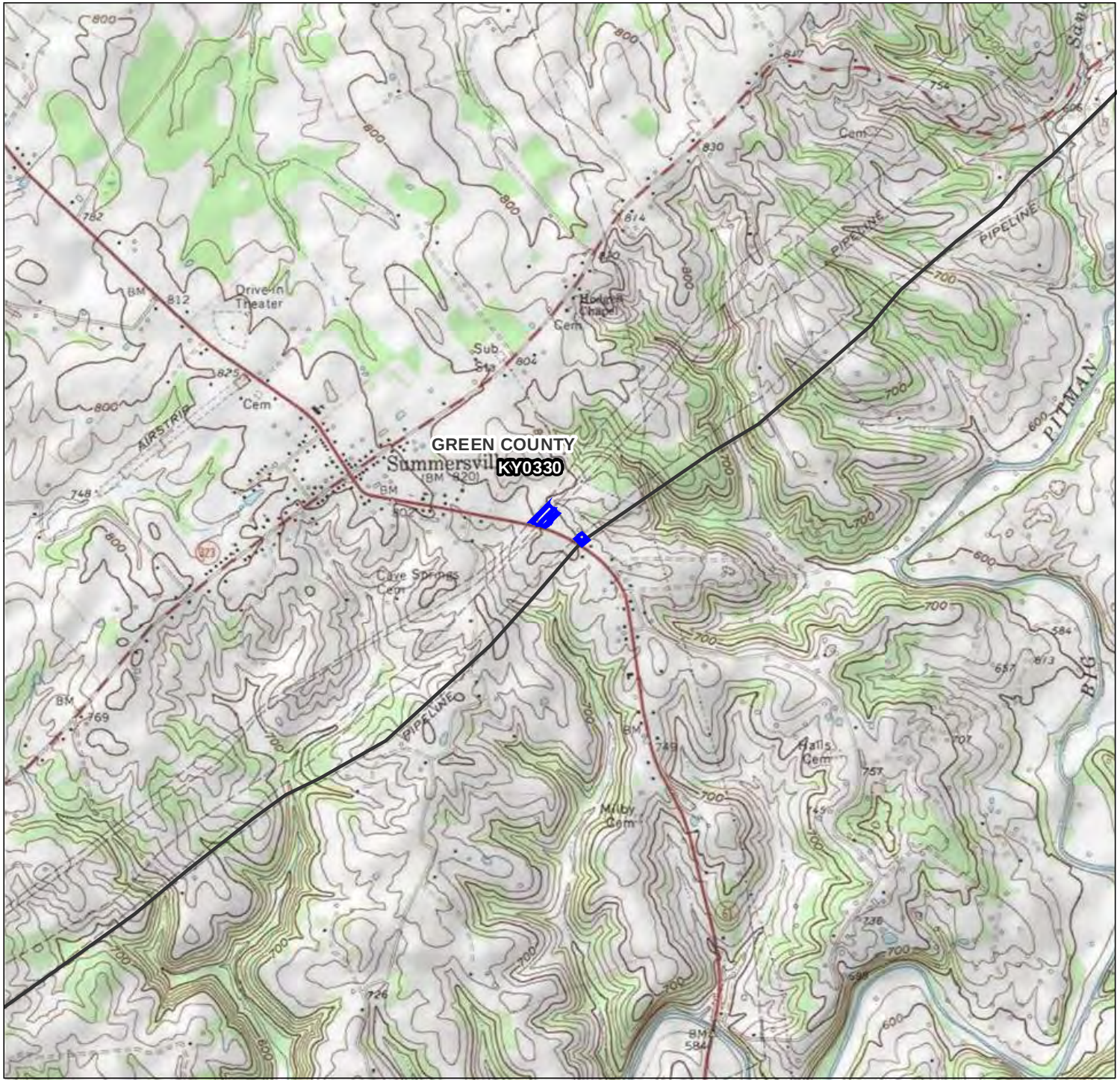


Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

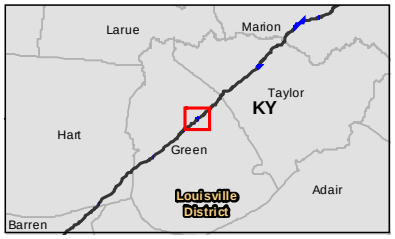
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

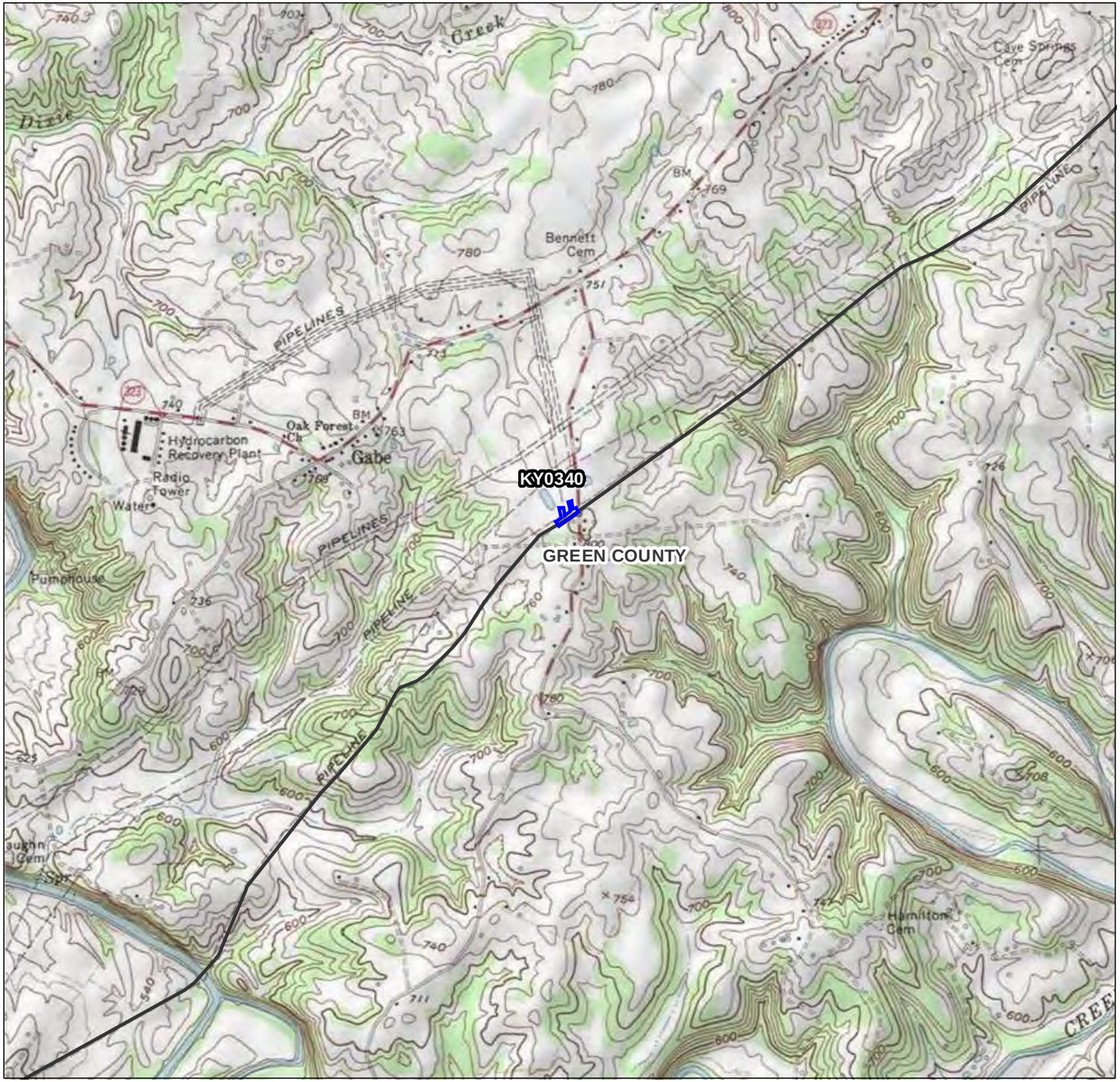


Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

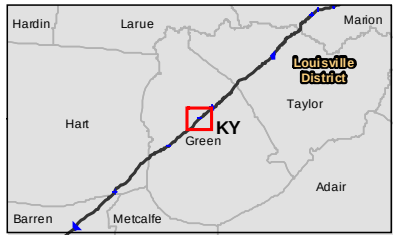
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

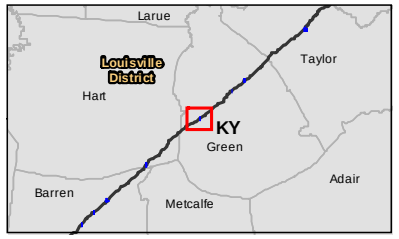
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

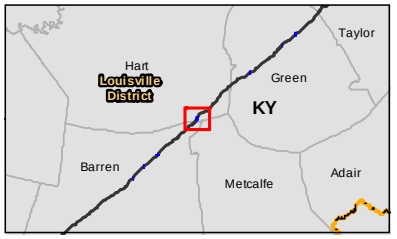
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

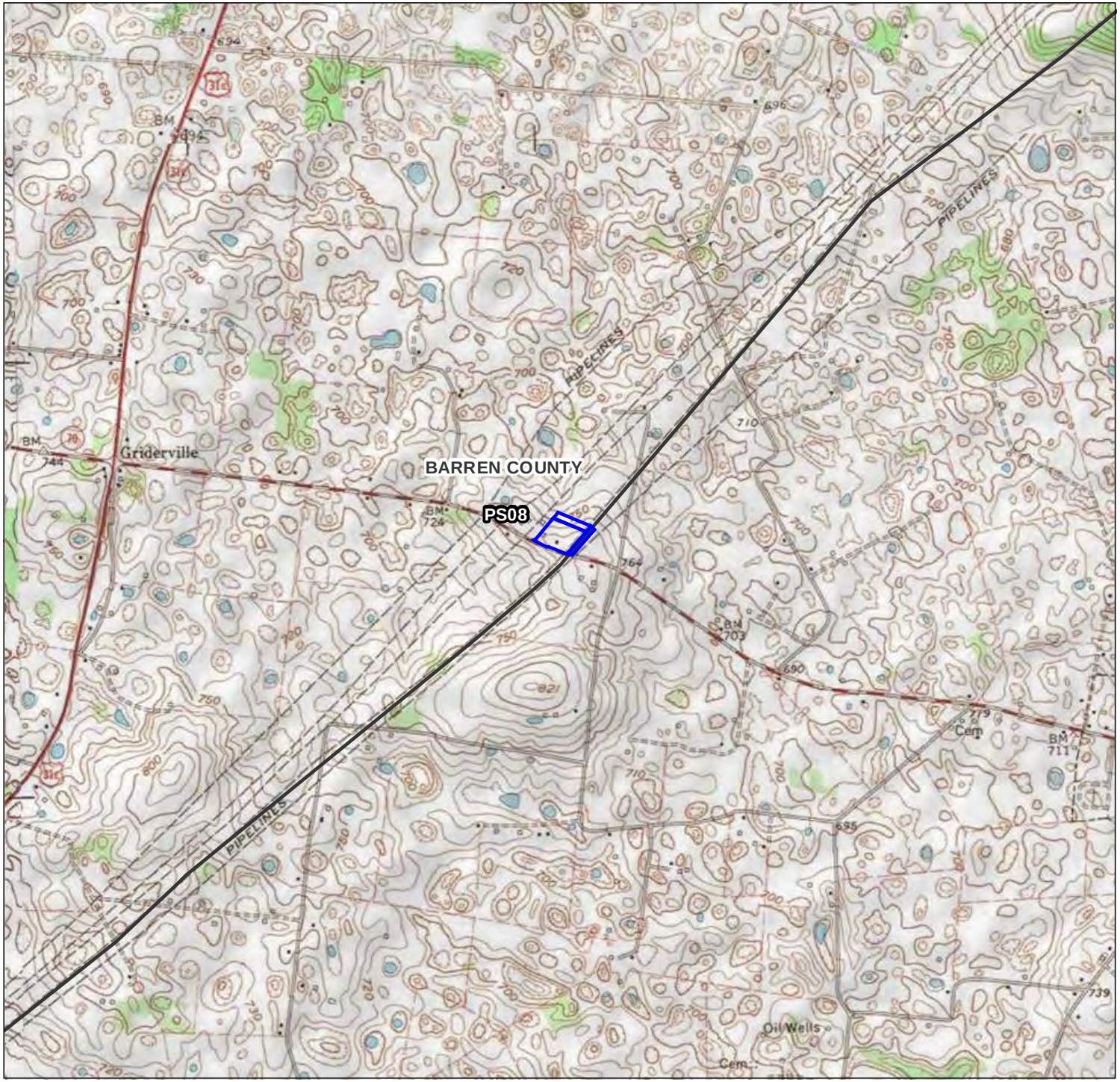


Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

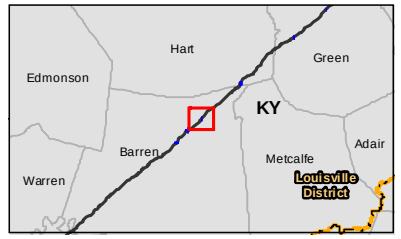
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

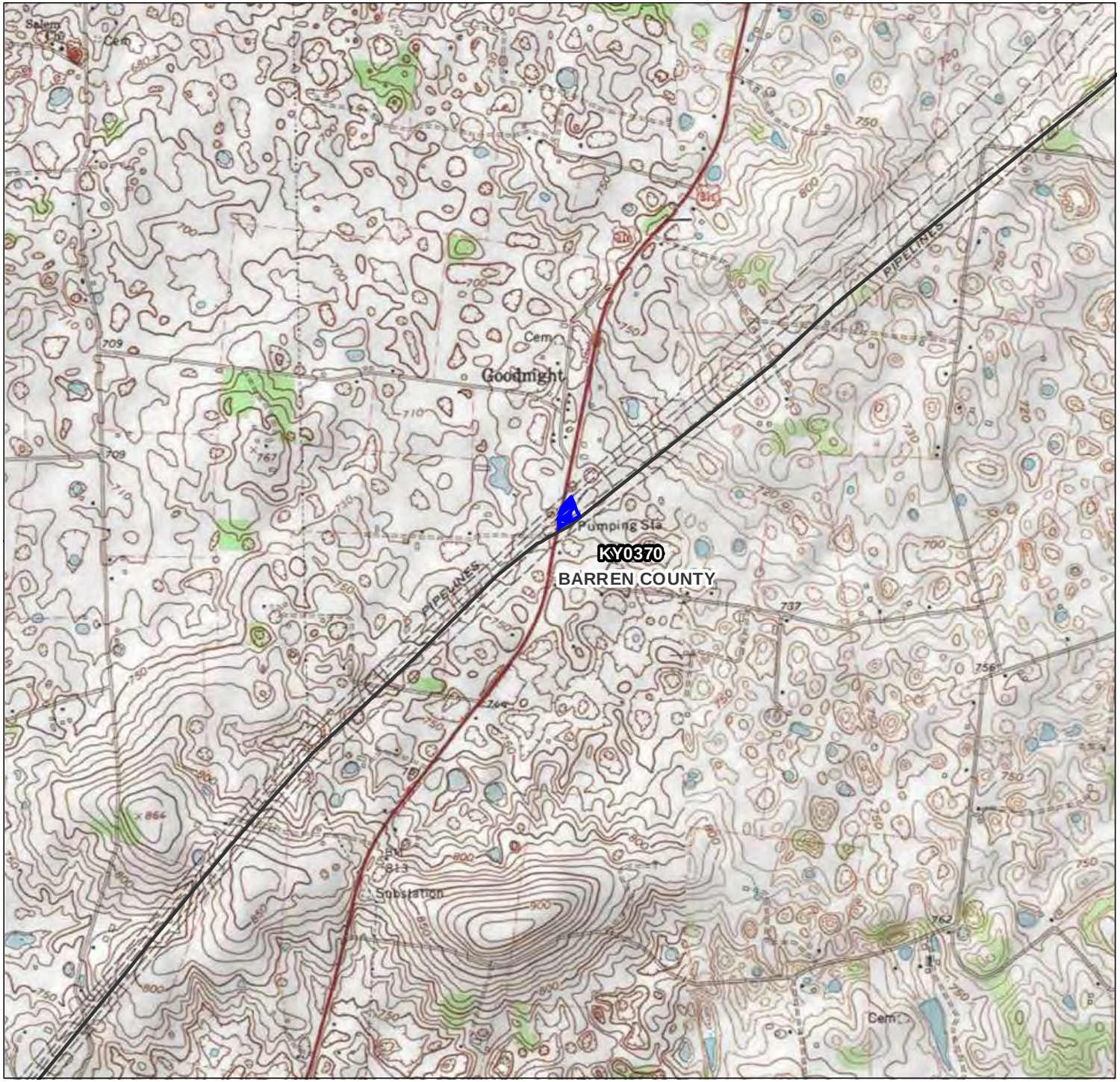


Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

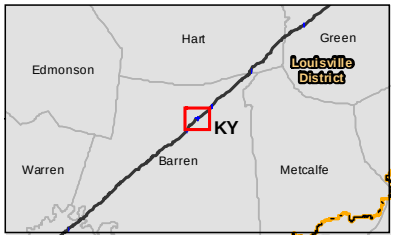
0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

N

Legend

- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

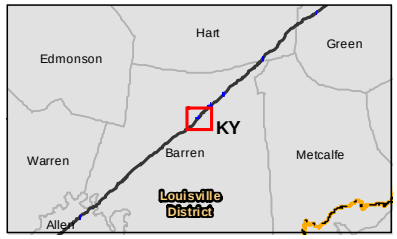
Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend

- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

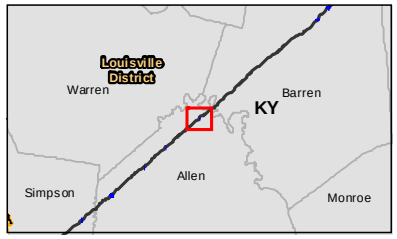
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

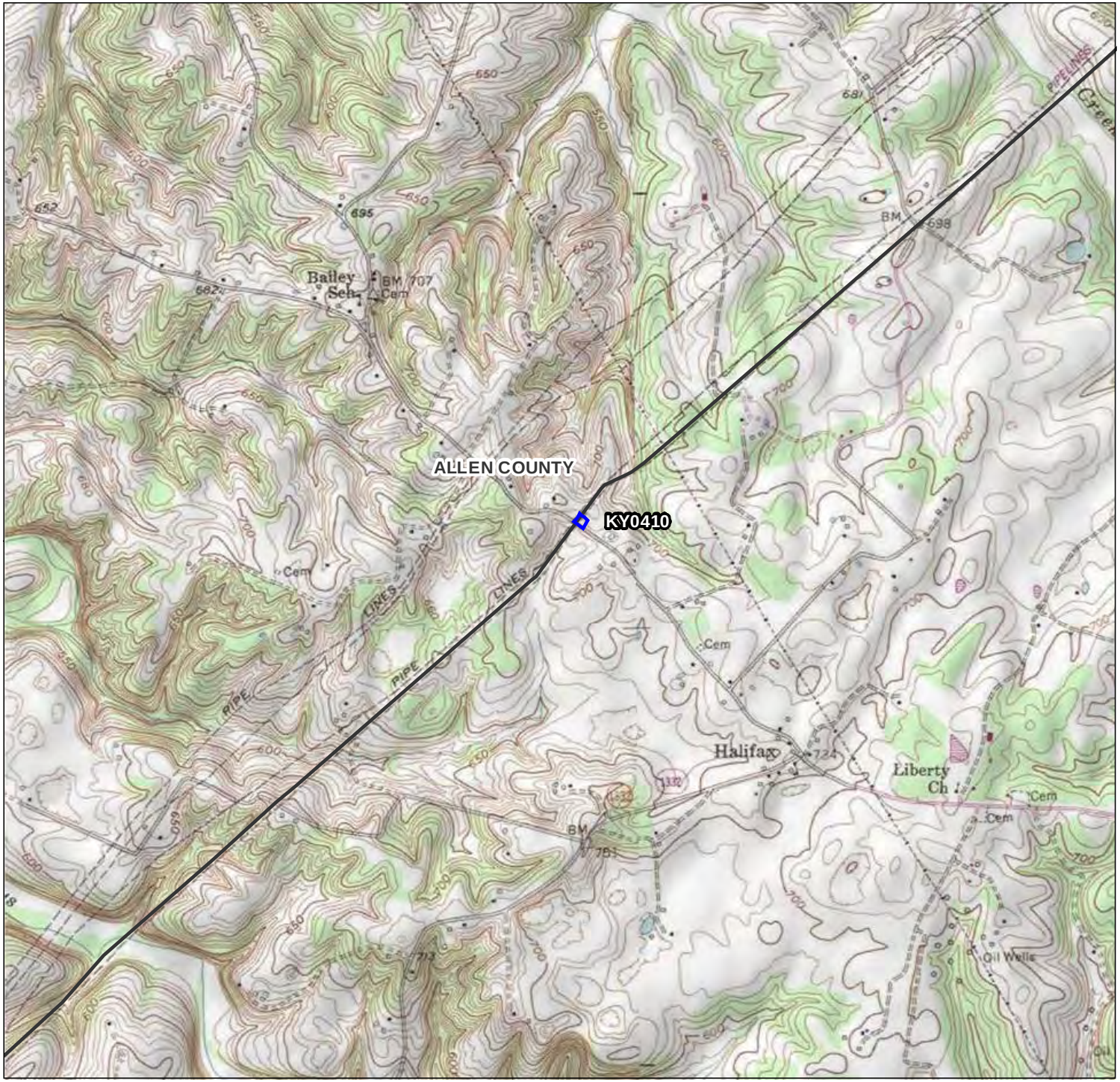


Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

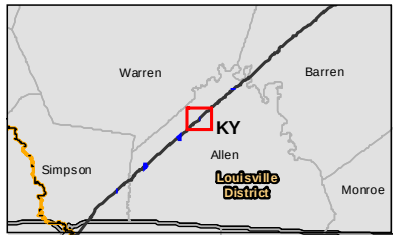
Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend

- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

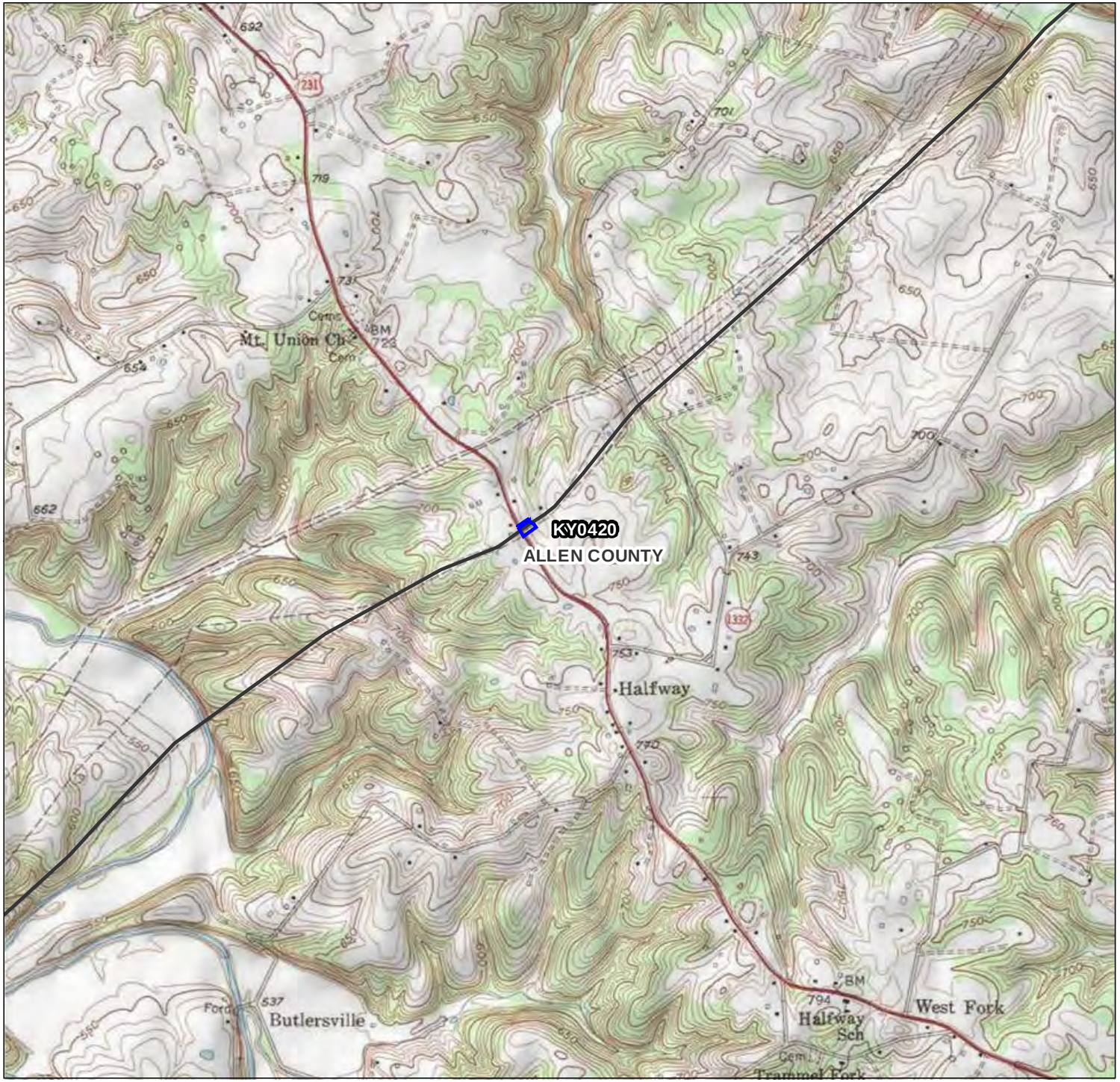


Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

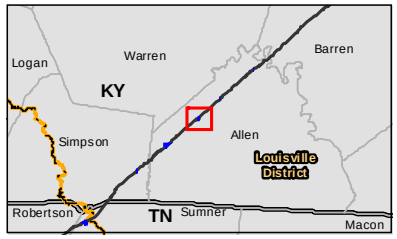
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

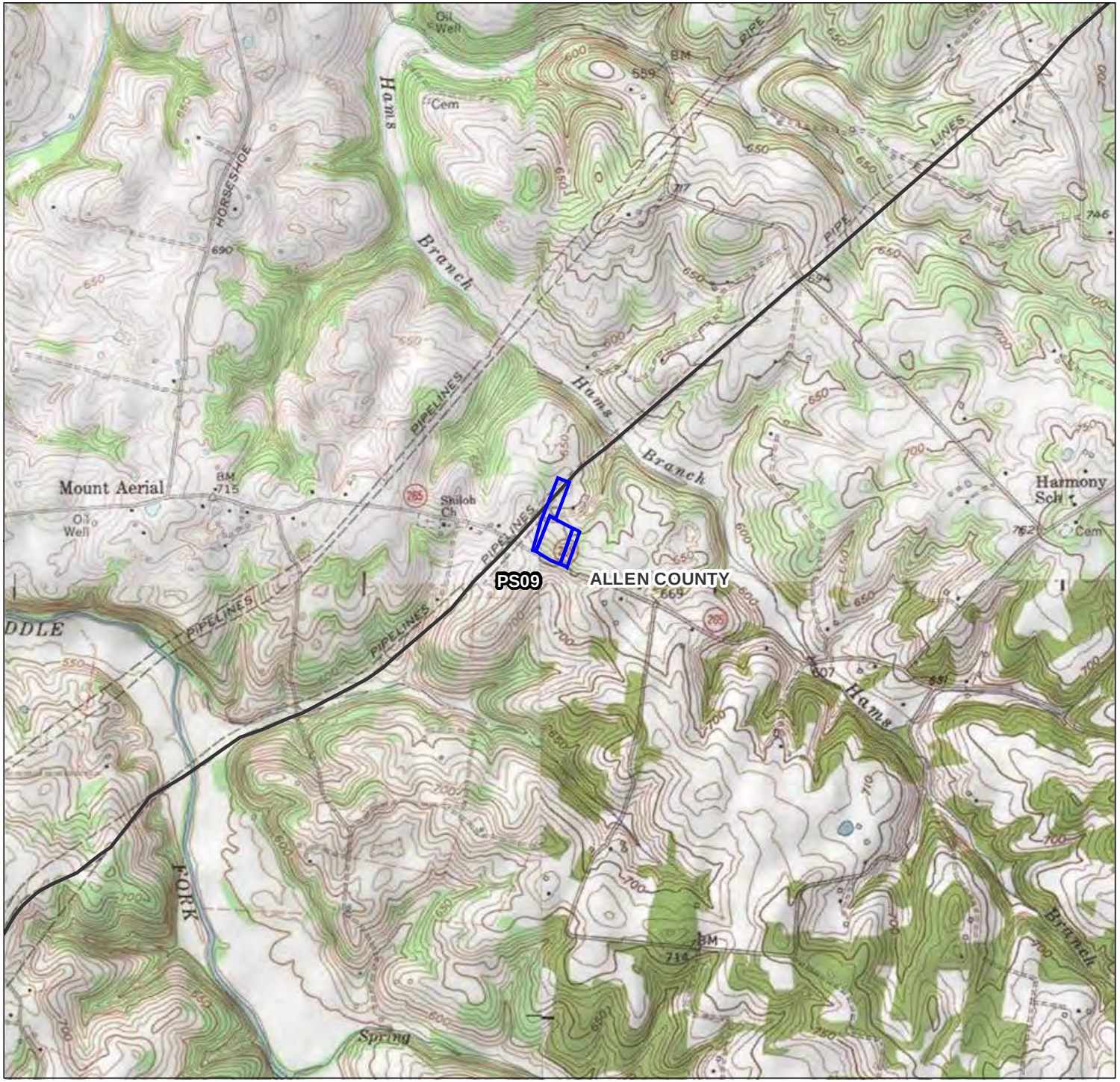


Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary

Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
2

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by BJ on 2015-01-21

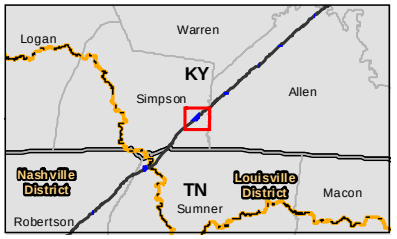
0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

N

Legend

- Access Roads
- New Build Pipeline
- Existing Pipeline
- Facilities
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure 3

Environmental Features – USACE Louisville District

Figure No.
3

Title
Environmental Features

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-22
Technical Review by MP on 2015-01-29
Independent Review by BJ on 2015-01-29

0 250 500 Feet
1:6,000 (At Original document size of 8.5x11)

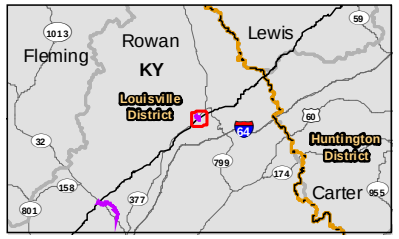
N

Legend
- Pipeline Centerlines
- Access Road Centerlines
- Permanent Aboveground Facility (WOUS within boundary would result in a permanent loss)*
- New Permanent Access Road (WOUS within boundary would result in a permanent loss)*
- Permanent Easement
- Permanent Easement - Bore / HDD
- Temporary or Additional Temporary Workspace
- Temporary Access Road
- Survey Corridor
- Field Located Stream or River
- NHD Derived Stream or River
- Field Located Two-Line Stream or River
- NHD Derived Two-Line Stream or River
- Field Located Open Water (Lake or Pond)
- NHD Derived Open Water (Lake or Pond)
- Field Delineated Wetland Area
- NWI Derived Wetland Area
- USACE District Boundary
- Parcels

FEMA Special Flood Hazard Areas
- 100-year Floodway
- 100-year Flood Zone
- 500-year Flood Zone

National Hydrography Data
- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

* WOUS = Waters of the U.S.



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 17S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USFWS, NRCS, USGS, FEMA, Esri
3. Orthophotography: World Imagery

Figure No.
3

Title
Environmental Features

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-22
Technical Review by MP on 2015-01-29
Independent Review by BJ on 2015-01-29

0 250 500 Feet
1:6,000 (At Original document size of 8.5x11)

N

Legend

- Pipeline Centerlines
- Access Road Centerlines
- Permanent Aboveground Facility (WOUS within boundary would result in a permanent loss)*
- New Permanent Access Road (WOUS within boundary would result in a permanent loss)*
- Permanent Easement
- Permanent Easement - Bore / HDD
- Temporary or Additional Temporary Workspace
- Temporary Access Road
- Survey Corridor
- Field Located Stream or River
- NHD Derived Stream or River
- Field Located Two-Line Stream or River
- NHD Derived Two-Line Stream or River
- Field Located Open Water (Lake or Pond)
- NHD Derived Open Water (Lake or Pond)
- Field Delineated Wetland Area
- NWI Derived Wetland Area
- USACE District Boundary
- Parcels

FEMA Special Flood Hazard Areas
- 100-year Floodway
- 100-year Flood Zone
- 500-year Flood Zone

National Hydrography Data
- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

* WOUS = Waters of the U.S.

Notes
1. Coordinate System: GCS North American 1983 UTM Zone 17S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USFWS, NRCS, USGS, FEMA, Esri
3. Orthophotography: World Imagery

Figure No.
3

Title
Environmental Features

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USA CE District: Louisville

Prepared by AB on 2015-01-22
Technical Review by MP on 2015-01-29
Independent Review by BJ on 2015-01-29

0 250 500 Feet
1:6,000 (At Original document size of 8.5x11)

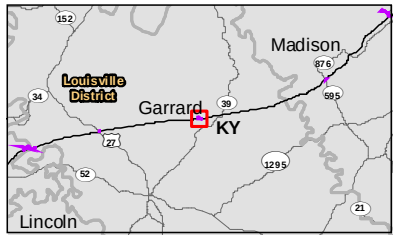
N

Legend
- Pipeline Centerlines
- Access Road Centerlines
- Permanent Aboveground Facility (WOUS within boundary would result in a permanent loss)*
- New Permanent Access Road (WOUS within boundary would result in a permanent loss)*
- Permanent Easement
- Permanent Easement - Bore / HDD
- Temporary or Additional Temporary Workspace
- Temporary Access Road
- Survey Corridor
- Field Located Stream or River
- NHD Derived Stream or River
- Field Located Two-Line Stream or River
- NHD Derived Two-Line Stream or River
- Field Located Open Water (Lake or Pond)
- NHD Derived Open Water (Lake or Pond)
- Field Delineated Wetland Area
- NWI Derived Wetland Area
- USACE District Boundary
- Parcels

FEMA Special Flood Hazard Areas
- 100-year Floodway
- 100-year Flood Zone
- 500-year Flood Zone

National Hydrography Data
- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

* WOUS = Waters of the U.S.



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USFWS, NRCS, USGS, FEMA, Esri
3. Orthophotography: World Imagery

Figure No.
3

Title
Environmental Features

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-22
Technical Review by MP on 2015-01-29
Independent Review by BJ on 2015-01-29

0 250 500 Feet
1:6,000 (At Original document size of 8.5x11)

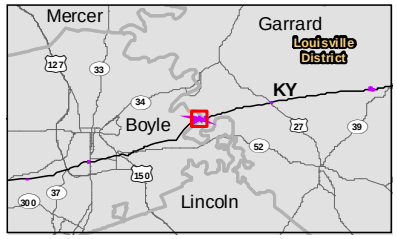
N

Legend
- Pipeline Centerlines
- Access Road Centerlines
- Permanent Aboveground Facility (WOUS within boundary would result in a permanent loss)*
- New Permanent Access Road (WOUS within boundary would result in a permanent loss)*
- Permanent Easement
- Permanent Easement - Bore / HDD
- Temporary or Additional Temporary Workspace
- Temporary Access Road
- Survey Corridor
- Field Located Stream or River
- NHD Derived Stream or River
- Field Located Two-Line Stream or River
- NHD Derived Two-Line Stream or River
- Field Located Open Water (Lake or Pond)
- NHD Derived Open Water (Lake or Pond)
- Field Delineated Wetland Area
- NWI Derived Wetland Area
- USACE District Boundary
- Parcels

FEMA Special Flood Hazard Areas
- 100-year Floodway
- 100-year Flood Zone
- 500-year Flood Zone

National Hydrography Data
- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

* WOUS = Waters of the U.S.



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USFWS, NRCS, USGS, FEMA, Esri
3. Orthophotography: World Imagery

Figure No.
3

Title
Environmental Features

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USA CE District: Louisville

Prepared by AB on 2015-01-22
Technical Review by MP on 2015-01-29
Independent Review by BJ on 2015-01-29

0 250 500 Feet
1:6,000 (At Original document size of 8.5x11)

N

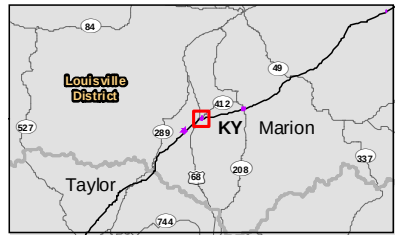
Legend

- Pipeline Centerlines
- Access Road Centerlines
- Permanent Aboveground Facility (WOUS within boundary would result in a permanent loss)*
- New Permanent Access Road (WOUS within boundary would result in a permanent loss)*
- Permanent Easement
- Permanent Easement - Bore / HDD
- Temporary or Additional Temporary Workspace
- Temporary Access Road
- Survey Corridor
- Field Located Stream or River
- NHD Derived Stream or River
- Field Located Two-Line Stream or River
- NHD Derived Two-Line Stream or River
- Field Located Open Water (Lake or Pond)
- NHD Derived Open Water (Lake or Pond)
- Field Delineated Wetland Area
- NWI Derived Wetland Area
- USACE District Boundary
- Parcels

FEMA Special Flood Hazard Areas
- 100-year Floodway
- 100-year Flood Zone
- 500-year Flood Zone

National Hydrography Data
- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

* WOUS = Waters of the U.S.



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USFWS, NRCS, USGS, FEMA, Esri
3. Orthophotography: World Imagery

Figure No.
3

Title
Environmental Features

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-22
Technical Review by MP on 2015-01-29
Independent Review by BJ on 2015-01-29

0 250 500 Feet
1:6,000 (At Original document size of 8.5x11)

N

Legend

- Pipeline Centerlines
- Access Road Centerlines
- Permanent Aboveground Facility (WOUS within boundary would result in a permanent loss)*
- New Permanent Access Road (WOUS within boundary would result in a permanent loss)*
- Permanent Easement
- Permanent Easement - Bore / HDD
- Temporary or Additional Temporary Workspace
- Temporary Access Road
- Survey Corridor
- Field Located Stream or River
- NHD Derived Stream or River
- Field Located Two-Line Stream or River
- NHD Derived Two-Line Stream or River
- Field Located Open Water (Lake or Pond)
- NHD Derived Open Water (Lake or Pond)
- Field Delineated Wetland Area
- NWI Derived Wetland Area
- USACE District Boundary
- Parcels

FEMA Special Flood Hazard Areas
- 100-year Floodway
- 100-year Flood Zone
- 500-year Flood Zone

National Hydrography Data
- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

* WOUS = Waters of the U.S.

Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USFWS, NRCS, USGS, FEMA, Esri
3. Orthophotography: World Imagery

Attachment 4 Wetlands and Waterbodies Delineation Report

ACRP AND UMTP PROJECT WETLANDS AND WATERBODIES DELINEATION REPORT

Louisville US Army Corps of Engineers (USACE)
District
(Kentucky)

Stantec Consulting Services Inc.

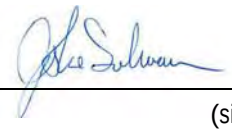
TRC Environmental Corporation

Prepared for:
Utica Marcellus Texas Pipeline LLC and
Tennessee Gas Pipeline Company, L.L.C.

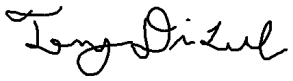
January 30, 2015

Sign-off Sheet

This document entitled ACRP AND UMTP PROJECT WETLANDS AND WATERBODIES DELINEATION REPORT was prepared by Stantec Consulting Services Inc. and TRC Environmental Corporation for the account of Utica Marcellus Texas Pipeline, LLC and Tennessee Gas Pipeline Company, L.L.C. The material in it reflects Stantec Consulting Services Inc. and TRC Environmental Corporation's best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Stantec Consulting Services Inc. and TRC Environmental Corporation accept no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Prepared by 
(signature)

Joshua Sulman



Approved by _____
(signature)

Tony DiLella

Table of Contents

LIST OF TABLES

LIST OF APPENDICES

Executive Summary

Tennessee Gas Pipeline Company, L.L.C. and Utica Marcellus Texas Pipeline LLC are jointly submitting this report to the US Army Corps of Engineers Louisville District for proposed construction activities related to two projects within the District. Because these two projects have overlapping construction activities in some areas within the District's service area, the report covers both projects. In its Abandonment and Capacity Restoration Project, Tennessee Gas Pipeline Company, L.L.C. proposes to abandon gas service and transfer by sale to an affiliate, Utica Marcellus Texas Pipeline LLC, approximately 964 miles of one of Tennessee Gas Pipeline Company, L.L.C.'s existing 100/200 Line pipelines from Main Line Valve 216 in Columbiana County, Ohio, to Station 40 in Natchitoches Parish, Louisiana. The Existing Pipeline Segment will be used by Utica Marcellus Texas Pipeline LLC to transport natural gas liquids from supply sources in the Utica and Marcellus shale regions to Mt. Belvieu, Texas. Utica Marcellus Texas Pipeline LLC is also pursuing a new project, the Utica Marcellus Texas Pipeline Project, to transport natural gas liquids from certain processing facilities in Ohio, Pennsylvania, and West Virginia to the Gulf of Mexico coastal areas.

In 2013 and 2014 Stantec Consulting Services, Inc. and TRC Environmental Corporation performed a wetland and waterbodies delineation of the Abandonment and Capacity Restoration Project and Utica Marcellus Texas Pipeline Project. This report discusses wetlands and waterbodies located within the US Army Corps of Engineers Louisville District in the state of Kentucky (Appendix A, Figures 1 and 2). Figure 1 illustrates the location of wetland and waterbodies delineation investigation areas only. Figure 2 illustrates details of these investigation areas, including wetlands and waterbodies, if determined to be present at those locations. Currently, the Utica Marcellus Texas Pipeline Project and Abandonment and Capacity Restoration Project include 42 workspaces and other facility locations within the US Army Corps of Engineers Louisville District. Nine wetlands, 14 streams and three open water bodies were identified.

Acronyms List

Abbreviation	Definition
ac	Acre
ACRP	Abandonment and Capacity Restoration Project
CS	Compressor Station
CWA	Clean Water Act
FERC	Federal Energy Regulatory Commission
Ft	Foot/feet
GPS	Global Positioning Systems
ha	Hectare
HDD	Horizontal directional drilling
in	Inch
KY	Kentucky
KYDEP	Kentucky Department for Environmental Protection
mi	Mile
MLV	Mainline Valve
NGL	Natural Gas Liquids
NHD	National Hydrography Data
NRCS	Natural Resources Conservation Services
NWI	National Wetlands Inventory
OHWM	Ordinary High Water Mark
OW	Open Water
PEM	Palustrine System Emergent Wetland Class
PFO	Palustrine System Forested Wetland Class
PS	Pump Station
PSS	Palustrine System Scrub-shrub Wetland Class
R	River (two-line stream)
RBP	Rapid Bioassessment Protocol
ROW	Right-of-way
S	Stream
ST	Stream
TRC	TRC Environmental Corporation
UMTP	Utica Marcellus Texas Pipeline, LLC
UMTP Project	Utica Marcellus Texas Pipeline Project
US	United States of America
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	US Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WL	Wetland
WOUS	Waters of the United States

1.0 Introduction

Tennessee Gas Pipeline Company, L.L.C. ("Tennessee") and Utica Marcellus Texas Pipeline LLC ("UMTP") are jointly submitting an application to the United States ("US") Army Corps of Engineers ("USACE") Louisville District ("District") for proposed construction activities related to two projects within the District. Because these two projects have overlapping construction activities in some areas within the District's service area, the application covers both projects. Initially, these projects were discussed jointly as the UMTP Project, a joint venture between Kinder Morgan Energy Partners, L.P. and MarkWest Utica EMG, L.L.C. Subsequently, the project proponents have changed to include only Tennessee and UMTP. A description of each project is provided below:

1.1 PROJECT DESCRIPTION

1.1.1 ACRP

In its ACRP, Tennessee proposes to abandon gas service and transfer by sale to an affiliate, UMTP, approximately 964 miles of one of Tennessee's existing 100/200 Line pipelines from near Main Line Valve ("MLV") 216 in Columbiana County, Ohio, to Station 40 in Natchitoches Parish, Louisiana ("the Existing Pipeline Segment"). The Existing Pipeline Segment will be used by UMTP to transport natural gas liquids ("NGL") from supply sources in the Utica and Marcellus shale regions to Mt. Belvieu, Texas. The proposed abandonment of the Existing Pipeline Segment would result in a reduction in North-to-South capacity along Tennessee's 100/200 Line of approximately 270,000 Dth/day, which Tennessee proposes to restore by: (i) installing four new mid-point compressor stations, all in Ohio; (ii) adding additional compression at Station 110; (iii) adding additional compression at a compressor station proposed to be constructed as part of Tennessee's Broad Run Expansion Project; (iv) installing approximately 7.6 miles of 36-inch pipe near MLV 111 in Lewis and Carter Counties, Kentucky; (v) modifying individual crossovers and taps; and (vi) performing certain other minor pipe replacement work (collectively, the "Restoration Work"). Tennessee anticipates that, with appropriate regulatory authorizations, Tennessee will be able to complete the Restoration Work and transfer the Existing Pipeline Segment to UMTP by late 2017.

1.1.2 UMTP

UMTP is pursuing a new project to transport NGLs from certain processing facilities in Ohio, Pennsylvania, and West Virginia to the Gulf Coast. As part of its UMTP Project, UMTP proposes to purchase from its affiliate, Tennessee, the interstate natural gas pipeline, which is currently subject to the jurisdiction of the Federal Energy Regulatory Commission ("FERC" or "Commission"), and which spans approximately 964 miles from Tennessee's MLV 216 in Columbiana County, Ohio, to Tennessee's existing Station 40 in Natchitoches Parish, Louisiana. As soon as reasonably practicable following Tennessee's receipt of FERC authorization to abandon the Existing Pipeline Segment, which such authorization Tennessee will pursue as part

of its ACRP, UMTP will convert the Existing Pipeline Segment to NGL service. The UMTP Project will also include: (i) the construction of approximately 160 miles of greenfield lateral/collector lines in Ohio, Pennsylvania, and West Virginia; and (ii) the construction of approximately 202 miles of greenfield pipeline from the terminus of the Existing Pipeline Segment in Natchitoches Parish, Louisiana, to Mont Belvieu, Texas.

Specifically, within the Louisville District, Tennessee and UMTP propose construction of pipeline facilities listed in Table 1.

Table 1. Proposed Construction Activities within the Louisville District

Workspaces				Station Gaps	Off-ROW Tap Reconnects (count)	Total Off-ROW Tap Reconnects Length (miles)	Individual Off-ROW Tap Reconnects Lengths (miles)	New Compressors at Existing Compressor Stations	New Compressor Stations	New Pump Stations	New NGL Main Line Valves	Conversion Pipeline HDD Workspaces	
TOTAL	UMTP Project	ACRP	UMTP Project & ACRP	UMTP Project & ACRP	UMTP Project & ACRP	UMTP Project & ACRP	UMTP Project & ACRP	ACRP	ACRP	UMTP Project	UMTP Project	UMTP Project	UMTP Project & ACRP
25	0	1	24	1	2	2.16	1.67, 0.76	2	0	6	4	0	2

Introduction
January 30, 2015

In 2013 and 2014, Stantec Consulting Services, Inc. ("Stantec") and TRC Environmental Corporation ("TRC") performed wetland and waterbody delineations for the ACRP and UMTP Project. Delineations were conducted at locations proposed for construction by the ACRP and UMTP Project (Table 1). These included discrete workspace locations located along an existing pipeline corridor, as well as other proposed pipeline facility locations (e.g., pump stations, compressor stations). For discrete workspaces and pipeline facility locations, delineations were conducted within the proposed construction location boundary. This report discusses wetlands and waterbodies located within the USACE Louisville District, including Rowan, Bath, Madison, Garrard and Marion counties in Kentucky ("KY") (Appendix A, Figure 1). Currently, the ACRP and UMTP Project include 25 workspaces, one station gap, two off-ROW tap reconnects, two new compressors at existing compressor stations, six new pump stations, four new NGL main line valves, and two conversion pipeline HDD workspaces within the USACE Louisville District. The proposed workspaces and other facility locations are located adjacent to an existing pipeline. In most cases, the proposed construction locations partially overlap the Tennessee and UMTP permanent right-of-way (ROW). Wetland and waterbody delineations were completed within areas proposed for construction as part of the ACRP and UMTP Project.

The purpose of the wetland and waterbodies delineation was to identify and locate wetlands and waterbodies within the areas proposed for construction as part of the ACRP and UMTP Project. Delineations were completed by Stantec and TRC scientists in November 2013, as well as from July – October 2014. As a result of the delineations, nine wetlands, 14 streams and three waterbodies were identified. Additional field surveys will continue in 2015 as necessary for areas not yet surveyed (e.g., due to access restrictions during the 2013 and 2014 field surveys).

Wetlands and waterbodies that are considered Waters of the US ("WOUS") are subject to regulation under Section 404 of the Clean Water Act ("CWA") and the jurisdictional regulatory authority lies with the USACE. Counties, townships and municipalities may also have local regulatory authority over certain types of wetlands and waterbodies. Tennessee and UMTP will need to obtain all required permits and approvals prior to construction.

2.0 Methods

The US Geologic Survey ("USGS") topographic maps, US Department of Agriculture ("USDA") Natural Resources Conservation Service ("NRCS") soil survey, the National Wetlands Inventory ("NWI") map, National Hydrography Data ("NHD"), and aerial photography were reviewed to assess the likelihood of occurrence and probable location of wetlands and waterbodies within the proposed construction locations. Following this background review, Stantec performed site reconnaissance and data collection at the proposed construction locations in November 2013, as well as from July – October 2014. The objectives of this effort were to: (i) characterize the vegetation; (ii) classify the soils; (iii) inspect hydrology; and (iv) assess whether potential WOUS were present in the workspaces at each proposed construction location.

Data on each delineated resource were collected as appropriate using applicable data forms as provided by the USACE and US Environmental Protection Agency ("USEPA"). These forms include:

- Wetland Determination Data Form, USACE (Appendix B);
- Rapid Bioassessment Protocol ("RBP") Habitat Assessment Field Data Sheet – Low Gradient Streams, USEPA (Appendix C); and
- RBP Habitat Assessment Field Data Sheet – High Gradient Streams, USEPA (Appendix C).

2.1 WETLANDS

2.1.1 Wetland Definition

Wetlands were identified per the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory1987) and the applicable *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountain and Piedmont Region* (Version 2.0) (USACE 2011). Per these references, the definition of wetlands is:

> *"Wetlands are those areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."*

This definition addresses three characteristics of wetlands: (i) hydrophytic vegetation, (ii) hydric soils, and (iii) wetland hydrology.

2.1.2 Wetland Classification

Wetlands were classified according to *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). In this classification system, wetland habitats are divided into five major systems including: (i) Marine, (ii) Estuarine, (iii) Lacustrine, (iv) Palustrine, and (v) Riverine. Each of these systems is further divided into subsystems, classes, and subclasses.

2.1.3 Wetland Delineation

Wetland delineations were completed in accordance with the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountain and Piedmont Region* (Version 2.0) (USACE 2011). Wetland boundaries were located using a Trimble® GeoExplorer Global Positioning System ("GPS") receiver capable of submeter accuracy. Wetland Determination Data Forms were completed at sample point locations within each wetland identified and within associated upland communities. The wetland indicator status for each of the dominant species was obtained using the 2013 National Wetland Plant List (Lichvar 2013) and 2014 updated list (Lichvar et al. 2014). Representative photographs were taken as appropriate (Appendix E).

Additionally, NWI feature boundaries were available to Stantec and TRC scientists on GPS units and depicted on field map sets used during field investigations. When an NWI feature was present within the proposed construction location, but wetland features were not observed at that location in the field, vegetation, soil, and hydrology data were completed from a sample plot using the Wetland Determination Data Form to confirm non-wetland (upland) conditions. Where wetlands were observed in the field corresponding with mapped NWI features, the associated NWI wetland classification was included on the Wetland Determination Data Form.

2.2 WATERBODIES

2.2.1 Waterbodies Definition

Waterbodies included ephemeral, intermittent, and perennial streams, ditches, and open water bodies. Ditches were classified as waterbodies when there were obvious signs of water movement at some point through the year and showed evidence of bed/banks, flow, scour, and/or ordinary high watermark ("OHWM").

2.2.2 Waterbodies Classification

2.2.2.1 Streams

Flow regime for streams was defined as ephemeral, intermittent, or perennial. Ephemeral streams are defined as those features with an obvious bed and bank that are inundated following spring thaw and after periods of rainfall. Otherwise, ephemeral streams remain dry. Intermittent streams are defined as those features with an obvious bed and bank, and are likely to have some water present throughout the growing season (typically a minimum of three months within a year). These features will typically show evidence of sorting or stratification of materials. Perennial streams have an obvious bed and bank and have continuous presence of water as well as evidence of aquatic life (fauna and flora).

2.2.2.2 Other Waterbodies

Open waterbodies were assessed using the definition described in Cowardin et al. (1979) which includes wetland and deepwater habitats with most of the following characteristics: (i) situated in a topographic depression or a dammed river channel; (ii) lacking trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 30% areal coverage; and (iii) total area exceeds 8 hectares ("ha"; 20 acres). Similar wetland and deepwater habitats totaling less than 8 ha are also included in the Lacustrine System if an active wave-formed or bedrock shoreline feature makes up most or part of the boundary, or if the water depth in the deepest part of the basin exceeds 2 meters (6.6 feet) at low water (estimated).

2.2.3 Stream and Waterbody Delineation

For streams less than 15 feet wide, the centerline of the stream was located using the GPS receiver. For streams 15 feet wide or greater, each bank at the OHWM was located using the GPS receiver. Field data were collected on stream dimensions, substrate, and stream bank characteristics including OHWM and bankfull widths, heights, slope, and vegetation.

Data collected on other waterbodies included dimensions, water depth, OHWM height above current water level, substrates, and surrounding vegetation. The OHWM of the waterbody was located using the GPS receiver. Representative photographs were taken upstream, downstream, and perpendicular to the banks of each delineated stream and waterbody.

2.3 UPLAND CONVEYANCE FEATURES

2.3.1 Upland Conveyance Feature Definition

For the purposes of ACRP and UMTP Project, upland conveyance features are man-made or natural drainage features, including natural drainage features that have been modified by channelization, that (i) flow only in direct response to precipitation runoff in their immediate locality; (ii) whose channels are at all times above the ground water table; (iii) that are not suitable for drinking water supplies; and (iv) in which hydrological and biological analyses indicate that, under normal weather conditions, due to naturally occurring ephemeral or low flow there is not sufficient water to support fish, or multiple populations of obligate lotic aquatic organisms whose life cycle includes an aquatic phase of at least two months. Where identified in the field, these features were classified as roadside ditch, vegetated upland swale, non-vegetated upland swale, agricultural ditches, or erosional gully.

2.3.2 Conveyance Feature Classification

An upland conveyance feature is a feature that does not exhibit evidence of a bed/banks and OHWM (i.e., not a stream), and is not a wetland, but has the potential to convey water. Ditches and drainage ways were mapped as upland conveyance features when: (i) they were entirely vegetated and dominated by Facultative Upland and Upland species (not a wetland); and (ii) they lacked evidence of flow, including scour due to flow, bed/banks, and OHWM.

During 2013 field surveys, vegetative swales were assessed using the Wetland Determination Data Form to characterize upland vegetation. During the 2014 field surveys, the Wetland Determination Data Form was not completed for upland conveyance features due to the non-vegetated, erosional nature of many of these features. Conveyance features encountered during the 2013 and 2014 field surveys were located with a GPS receiver capable of submeter accuracy. Representative photographs were taken of each feature.

3.0 Overview of Proposed Construction Locations

3.1 GEOLOGY AND TOPOGRAPHY

The workspaces and other facility locations of the USACE Louisville District are within the Interior Plateau Ecoregion. The Interior Plateau is composed of open hills, irregular plains, and table lands. The natural vegetation is primarily oak-hickory forest, with some areas of bluestem prairie and cedar glades. The geology of the area is composed of Ordovician age rock in the central part of the state, with karst limestone formations south of Louisville, KY. The fertile land in central portion of the state is used predominately for agriculture (USEPA 2013).

3.2 CLIMATE

The NRCS Soil Surveys were consulted to assess climate data within Rowan, Bath, Montgomery, Powell, Clark, Madison, Garrard, Boyle, Marion, Taylor, Green, Hart, Barren, Allen, and Simpson counties in KY. The average winter temperature ranges from 34°F to 39°F, and the average daily minimum temperature ranges from 23°F to 29°F. The average summer temperature ranges from 73.5°F to 76°F and the average daily maximum temperature ranges from 85°F to 88°F. Precipitation varies widely from year to year, but generally it is abundant and well distributed. Precipitation occurs most frequently from April through September (USDA, NRCS 1973—2008).

3.3 SOILS

The NRCS Soil Surveys and Web Soil Survey were consulted to assess soil types within the proposed construction locations [accessed December 2014]. Soil data is included in Figure 2 in Appendix A. The table in Appendix D indicates the soil composition of the workspaces and whether the soil is partially hydric, predominantly hydric, or non-hydric, according to the NRCS Hydric Soils List.

4.0 Results

As a result of the 2013 and 2014 field surveys, nine wetlands, 14 streams, and three open waterbodies were identified within the proposed construction areas within the USACE Louisville District. The locations of the features identified are summarized in Table 2 and shown on Figure 2 (Appendix A).

Section 4.1 summarizes the results of the wetland and waterbody delineations conducted within proposed workspaces and other facility locations located along the existing pipeline corridor.

Table 2. Summary of WOUS Identified within the USACE Louisville District

Proposed Construction Location	Dates Surveyed	County	Streams	Wetlands	Open Water
PS-04	October 23-24, 2014	Rowan (KY)	3	0	0
KY0110	November 5, 2013	Bath (KY)	0	1	0
CS 875 (KY0155)	August 11-14, 2014	Madison (KY)	10	5	2
PS-06	October 24, 2014	Garrard (KY)	1	0	0
KY0310	November 7, 2013	Marion (KY)	0	1	0
PS-07	October 31, 2013	Marion (KY)	0	2	1
		Total:	**14**	**9**	**3**

4.1 WORKSPACES AND OTHER FACILITY RESULTS

4.1.1 Wetlands

Nine wetlands were identified and delineated within the workspaces and other facility locations in the Louisville District. Wetland Determination Data Forms were completed for the wetland and adjacent upland (Appendix B). Representative photographs of the wetlands are contained herein (Appendix E). The wetland boundary and sample point locations are shown on Figure 2 (Appendix A). The wetlands are summarized in Table 3.

Table 3. Wetlands Identified within the Proposed Workspaces and Other Facility Locations in the USACE Louisville District

Workspace Or Other Facility*	Wetland	County	Type	Acres (ac)
KY0110	KY0110_WL01	Bath	PEM	0.028
CS 875 (KY0155)	KY-CS875_WL01	Madison	PFO	0.019
CS 875 (KY0155)	KY-CS875_WL02	Madison	PEM	0.178
CS 875 (KY0155)	KY-CS875_WL03	Madison	PEM	0.198
CS 875 (KY0155)	KY-CS875_WL04	Madison	PEM	0.038
CS 875 (KY0155)	KY-CS875_WL05	Madison	PEM	0.198
KY0310	KY0310E_WL01	Marion	PEM	0.026
PS-07	KY-MA-PS07_WL01	Marion	PEM	0.021
PS-07	KY-MA-PS07_WL02**	Marion	PEM	0.114
			Total	**0.820**

*Appendix A, Figure 2

**wetland and upland sample points taken at contiguous wetland KY-MA-PS07_WL01

4.1.2 Streams

Fourteen streams were identified and delineated within the workspaces and other facility locations. RBP Habitat Assessment Field Data Sheets were completed (Appendix C). Representative photographs of the streams are contained herein (Appendix E). The stream locations are shown on Figure 2 (Appendix A), and are summarized in Table 4.

Table 4. Streams Identified within the Proposed Workspaces and Other Facility Locations in the USACE Louisville District

Workspace Or Other Facility Location*	Resource Name	County	Flow Regime	Score	Scoring Method	Linear Length (ft)	OHWM Width (ft)
PS-04	KY-RO-PS04_ST01	Rowan	Intermittent	123	RBP	391	4
PS-04	KY-RO-PS04_ST02	Rowan	Intermittent	93	RBP	134	1.5
PS-04	KY-RO-PS04_ST03	Rowan	Intermittent	123	RBP	146	2
CS 875 (KY0155)	KY-CS875_ST01	Madison	Intermittent	129	RBP	85	2
CS 875 (KY0155)	KY-CS875_ST02	Madison	Intermittent	116	RBP	696	4
CS 875 (KY0155)	KY-CS875_ST03	Madison	Intermittent	115	RBP	526	3
CS 875 (KY0155)	KY-CS875_ST04	Madison	Intermittent	112	RBP	1093	4
CS 875 (KY0155)	KY-CS875_ST05	Madison	Perennial	144	RBP	1090	16
CS 875 (KY0155)	KY-CS875_ST06	Madison	Perennial	139	RBP	1600	5
CS 875 (KY0155)	KY-CS875_ST07	Madison	Intermittent	113	RBP	262	3
CS 875 (KY0155)	KY-CS875_ST08	Madison	Perennial	132	RBP	1241	8
CS 875 (KY0155)	KY-CS875_ST09	Madison	Intermittent	117	RBP	192	NA**
CS 875 (KY0155)	KY-CS875_ST10	Madison	Intermittent	111	RBP	251	3
PS-06	KY-GA-PS06_ST01	Garrard	Ephemeral	77	RBP	80	3
					Total	**7787**	

*Appendix A, Figure 2

**OHWM data not available

4.1.3 Open Water Features

Three open waterbodies were identified and delineated within the workspaces or other facility locations in the Louisville District. Representative photographs are located in Appendix E. The waterbody locations are shown on Figure 2 (Appendix A) and are summarized in Table 5.

Table 5. Open Water Identified within the Proposed Workspaces and Other Facilities in the USACE Louisville District

Workspace Or Other Facility Location*	Resource Name	County	Cowardin Class	Acreage
CS 875 (KY0155)	KY-CS875_OW01	Madison	PUB	0.199
CS 875 (KY0155)	KY-CS875_OW02	Madison	PUB	0.327
PS-07	KY-MA-PS07_OW01	Marion	PUB	0.335
			Total	**0.861**

*Appendix A, Figure 2

4.1.4 Upland Summary

Many of the existing workspaces and other proposed facility locations have been previously developed for existing pipeline uses (valve stations, pump stations, etc.). Within these developed areas, the land has been converted to gravel pads with associated pipeline infrastructure typically surrounded by regularly maintained lawn or field. Additional upland habitat within proposed construction locations included agricultural areas, pastureland, and mesic to dry-mesic forest types. Agricultural areas were commonly planted with commercial crops such as soybeans (*Glycine max*) or corn (*Zea mays*). Pasture was characterized by various herbaceous species commonly including Kentucky bluegrass (*Poa pratensis)*, tall fescue (*Schedonurus arundinaceus),* foxtail (*Setaria pumila),* Johnson grass (*Sorghum halapense),* oldfield aster (*Symphyotrichum pilosum)* and Queen Anne's lace (*Daucus carota)*. Common tree species observed within mesic to dry-mesic forested areas included pignut hickory (*Carya glabra),* northern red oak (*Quercus rubra),* American beech (*Fagus grandifolia),* red maple (*Acer rubrum),* tuliptree (*Liriodendron tulipifera),* black walnut (*Juglans nigra),* eastern redcedar (*Juniperus virginiana)* and black locust (*Robinia pseudacacia).* In all instances, the three primary criteria indicating wetland conditions (wetland hydrology, hydric soils, and hydrophytic vegetation) were not observed and these areas were classified as upland.

4.2 NWI FEATURES

No locations identified in the NWI database were determined to be upland areas based on the field delineations within the Louisville District.

4.3 OTHER ENVIRONMENTAL CONSIDERATIONS

This report is limited to the identification of wetlands and waterbodies within the proposed construction locations in the Louisville District. However, there may be other potentially regulated environmental features within these locations including, but not limited to, historical or archaeological features, endangered or threatened species, and/or floodplains. Federal, state, and local units of government and regional planning organizations may have regulatory authority to control or restrict land uses within, or in close proximity to, these features. UMTP and Tennessee are performing additional surveys as required by regulatory agencies.

5.0 Conclusion

In 2013 and 2014, Stantec and TRC performed wetland and waterway delineations of the proposed construction locations of the ACRP and UMTP Project within the USACE Louisville District in Kentucky.

Specifically, this report discusses proposed construction locations for the ACRP and UMTP Project located within the USACE Louisville District in Rowan, Bath, Montgomery, Powell, Clark, Madison, Garrard, Boyle, Marion, Taylor, Green, Hart, Barren, Allen, and Simpson counties in Kentucky. The objective of the wetland and waterbodies delineation was to identify the extent and spatial arrangement of wetlands and waterbodies within the proposed ACRP and UMTP Project area.

Nine wetlands, 14 streams and three open waterbodies were identified and delineated in the proposed construction locations in accordance with state and federal guidelines and were subsequently surveyed with GPS and mapped using GIS software. There were a combined total of 0.820 acre of wetland and 7,787 linear feet of stream habitat delineated within the proposed construction locations. Adjacent uplands included agricultural lands, pasture, woodland, and industrial/commercial land.

Wetlands and waterbodies that are considered WOUS are subject to regulation under Section 404 of the CWA and the jurisdictional regulatory authority lies with the USACE. Additional regulatory authority in the state of Kentucky lies with KYDEP. Counties, townships and municipalities may also have local regulatory authority over certain types of wetlands and waterbodies. Tennessee and UMTP will obtain all required permits and approvals prior to construction.

The information provided by Stantec and TRC regarding wetland boundaries and waterbodies is a scientific-based analysis of the wetland, upland and waterbodies conditions present on the site at the time of the fieldwork. The delineation was performed by experienced and qualified professionals (Appendix F) using standard practices and sound professional judgment. The ultimate decision on the presence/absence of jurisdictional features including wetland boundaries and OHWM of waterbodies rests with the USACE. As a result, there may be adjustments to identified features based upon review by a regulatory agency. An agency determination can vary from time to time depending on various factors including, but not limited to recent precipitation patterns and the season of the year. In addition, the physical characteristics of the site can change over time, depending on the weather, vegetation patterns, drainage activities on adjacent parcels, or other events. Any of these factors can change the nature and extent of wetlands and waterbodies within the proposed ACRP and UMTP Project.

6.0 References

Cowardin, L.M., V. Carter, F. Golet, and E. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. FWS/OBS-79/31. US Department of the Interior, Fish and Wildlife Service, Biological Services Program, Washington, D.C. Jamestown, ND: Northern Prairie Wildlife Research center Home Page. http://www.npwrc.usgs.gov/resource/1998/classwet/classwet.htm (Version 04DEC98).

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. (TR Y-87-1). Vicksburg, MS: US Army Engineers Waterbodies Experiment Station.

Lichvar, R.W. 2013. *The National Wetland Plant List:* 2013 wetland ratings. Phytoneuron 2013-49:1-241. http://rsgisias.crrel.usace.army.mil/NWPL/.

Lichvar, R.W., M. Butterwick, N.C. Melvin, and W. N. Kirchner. 2014. *The National Wetland Plant List:* 2014 Update of Wetland Ratings. Phytoneuron 2014-41:1-42. http://rsgisias.crrel.usace.army.mil/NWPL/.

Soil Survey Staff, Natural Resource Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database. Available online at http://datagateway.nrcs.usda.gov/ or http://websoilsurvey.nrcs.usda.gov/. Accessed Dec. 23, 2014.

USACE. 2005. *Guidance on Ordinary High Water Mark Identification.* (Regulatory Guidance Letter, No. 05-05). Retrieved from http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/GuidanceLetters.aspx.

USACE. 2011. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountain and Piedmont Region (Version 2.0),* ed. J. F. Berkowitz, J.S. Wakely, R.W. Lichvar, C.V. Nobel. ERDC/EL TR-12-9. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

US Department of Agriculture, Natural Resource Conservation Service (USDA, NRCS). 2010. *Field Indicators of Hydric Soils in the United States*, Version 7.0. L.M. Vasilas, G.W. Hurt, and C.V. Noble (eds.). USDA, NRCS in cooperation with the National Technical Committee for Hydric Soils.

USDA, NRCS. 1989. Soil Survey of Allen County, Kentucky. http://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=KY. Accessed Jan. 7, 2014.

USDA, NRCS. 2008. Soil Survey of Bath County, Kentucky. http://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=KY. Accessed Jan. 7, 2014.

USDA, NRCS. 1983. Soil Survey of Boyle County, Kentucky. http://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=KY. Accessed Jan. 7, 2014.

USDA, NRCS. 1982. Soil Survey of Green and Taylor Counties, Kentucky. http://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=KY. Accessed Jan. 7, 2014.

USDA, NRCS. 1993. Soil Survey of Hart County, Kentucky. http://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=KY. Accessed Jan. 7, 2014.

USDA, NRCS. 1973. Soil Survey of Madison County, Kentucky. http://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=KY. Accessed Jan. 7, 2014.

USDA, NRCS. 1991. Soil Survey of Marion County, Kentucky. http://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=KY. Accessed Jan. 7, 2014.

USDA, NRCS. 1986. Soil Survey of Montgomery County, Kentucky. http://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=KY. Accessed Jan. 7, 2014.

USDA, NRCS. 1986. Soil Survey of Powell County, Kentucky. http://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=KY. Accessed Jan. 7, 2014.

USDA, NRCS. 1985. Soil Survey of Simpson County, Kentucky. http://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=KY. Accessed Jan. 7, 2014.

US Environmental Protection Agency (USEPA). 2013. Level III ecoregions of the continental United States: Corvallis, Oregon, US EPA – National Health and Environmental Effects Research Laboratory, map scale 1:7,500,000. http://www.epa.gov/wed/pages/ecoregions/level_iii_iv.htm.

Appendix A Figures

Appendix A Figures
January 30, 2015

FIGURE 1. PROJECT LOCATION AND TOPOGRAPHY

Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

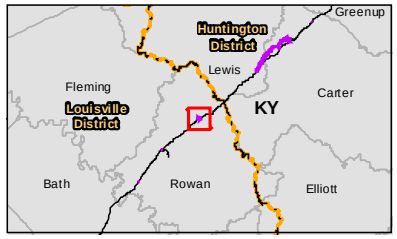
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 17S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

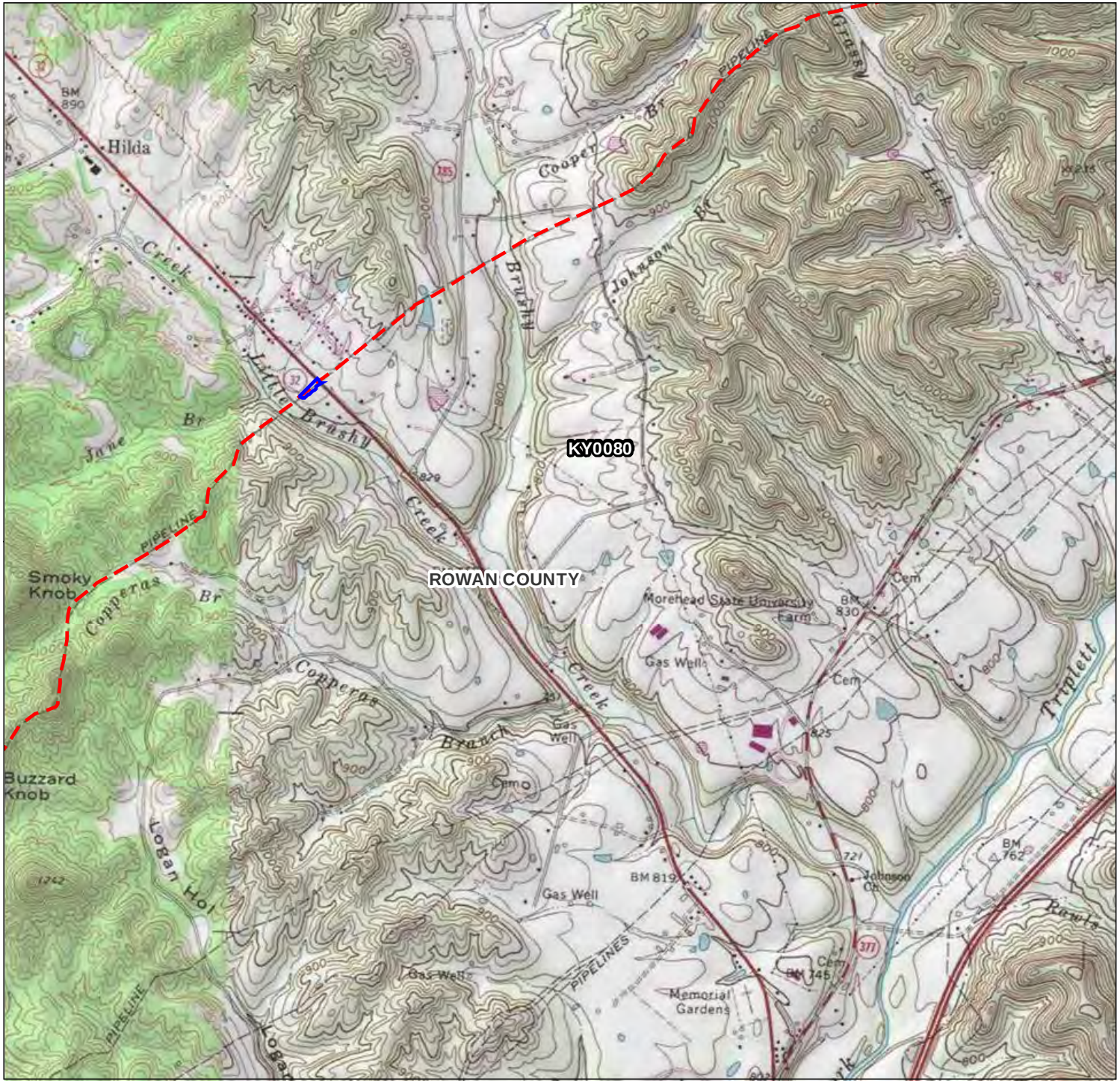


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

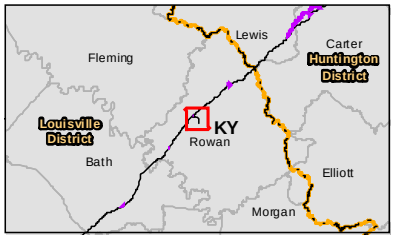
N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 17S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

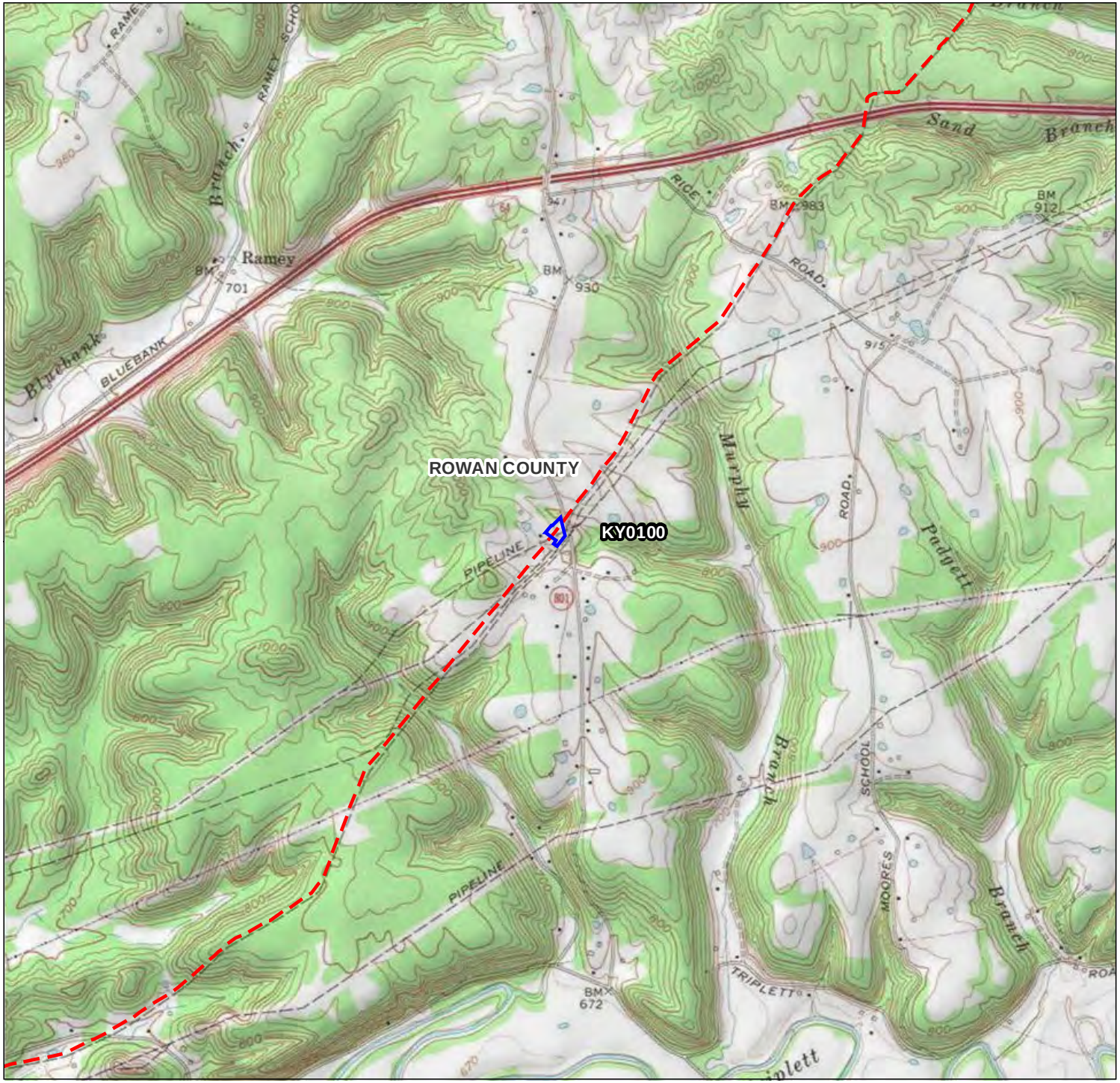


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

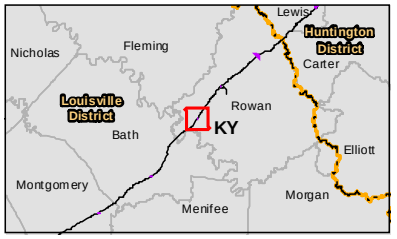
N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 17S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

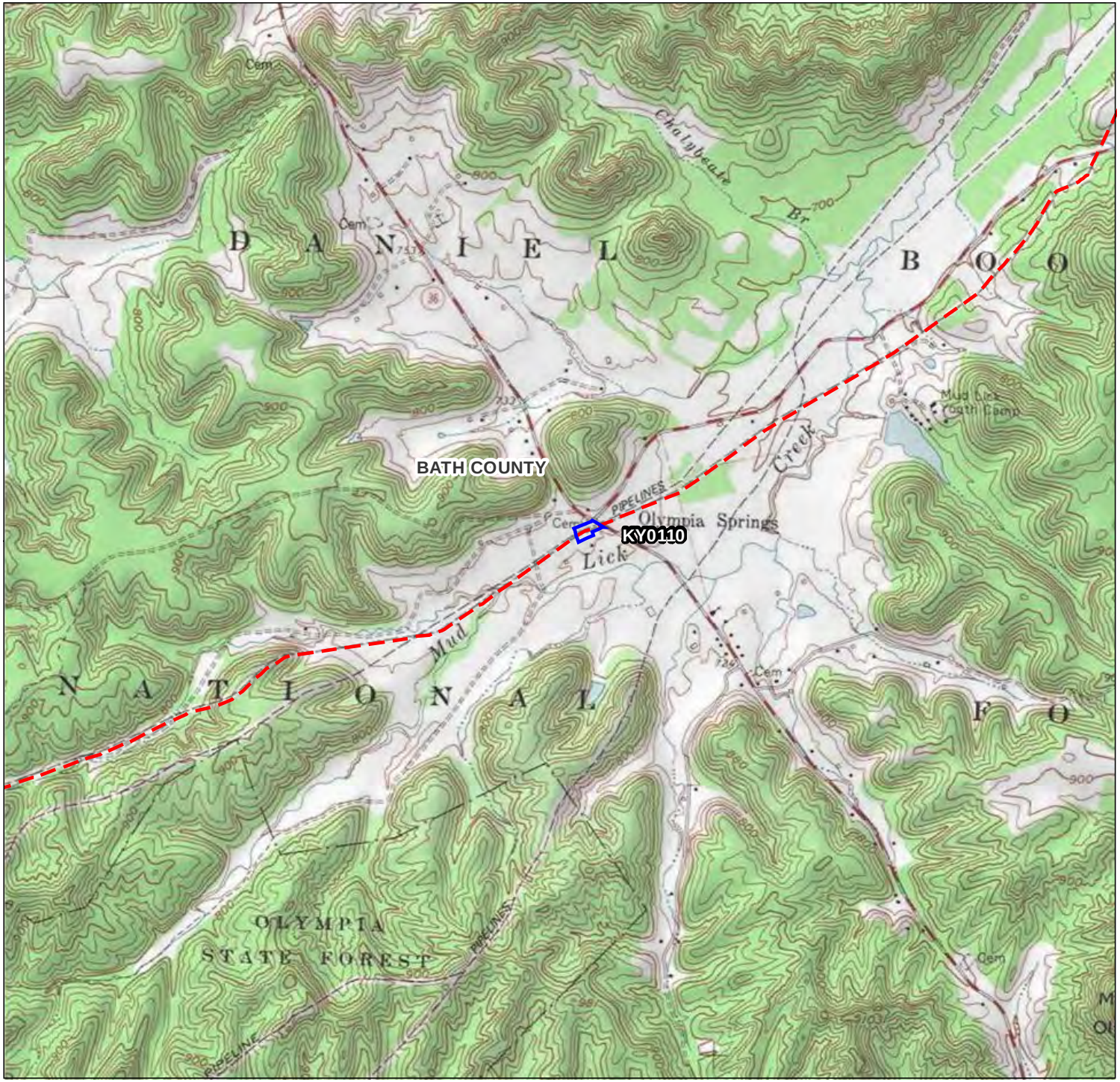


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

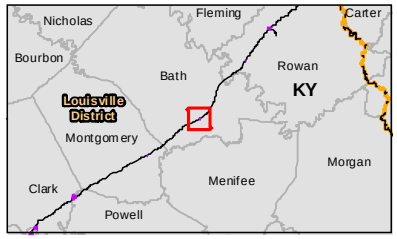
N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 17S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

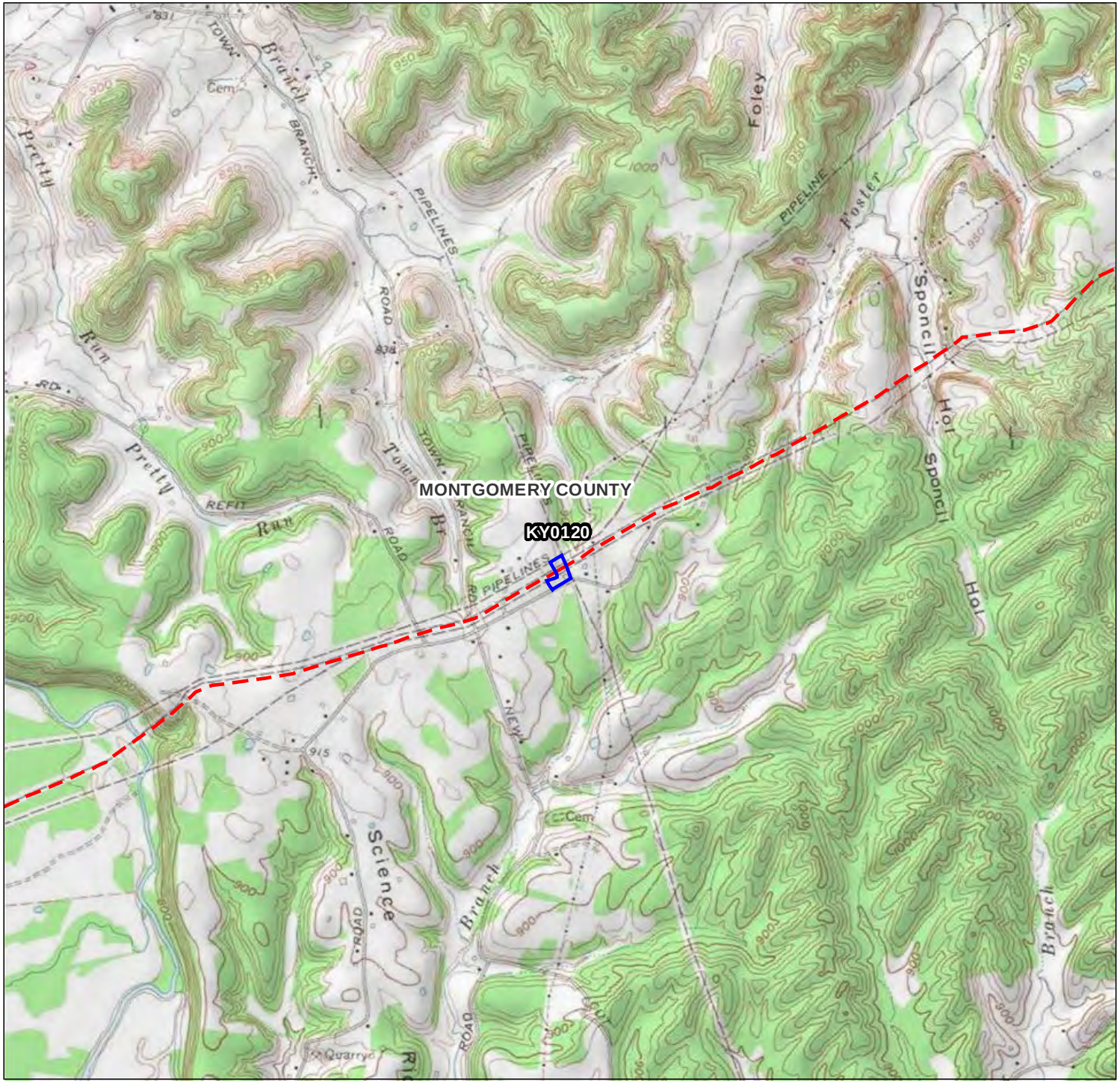


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

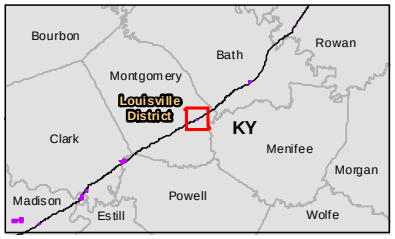
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 17S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

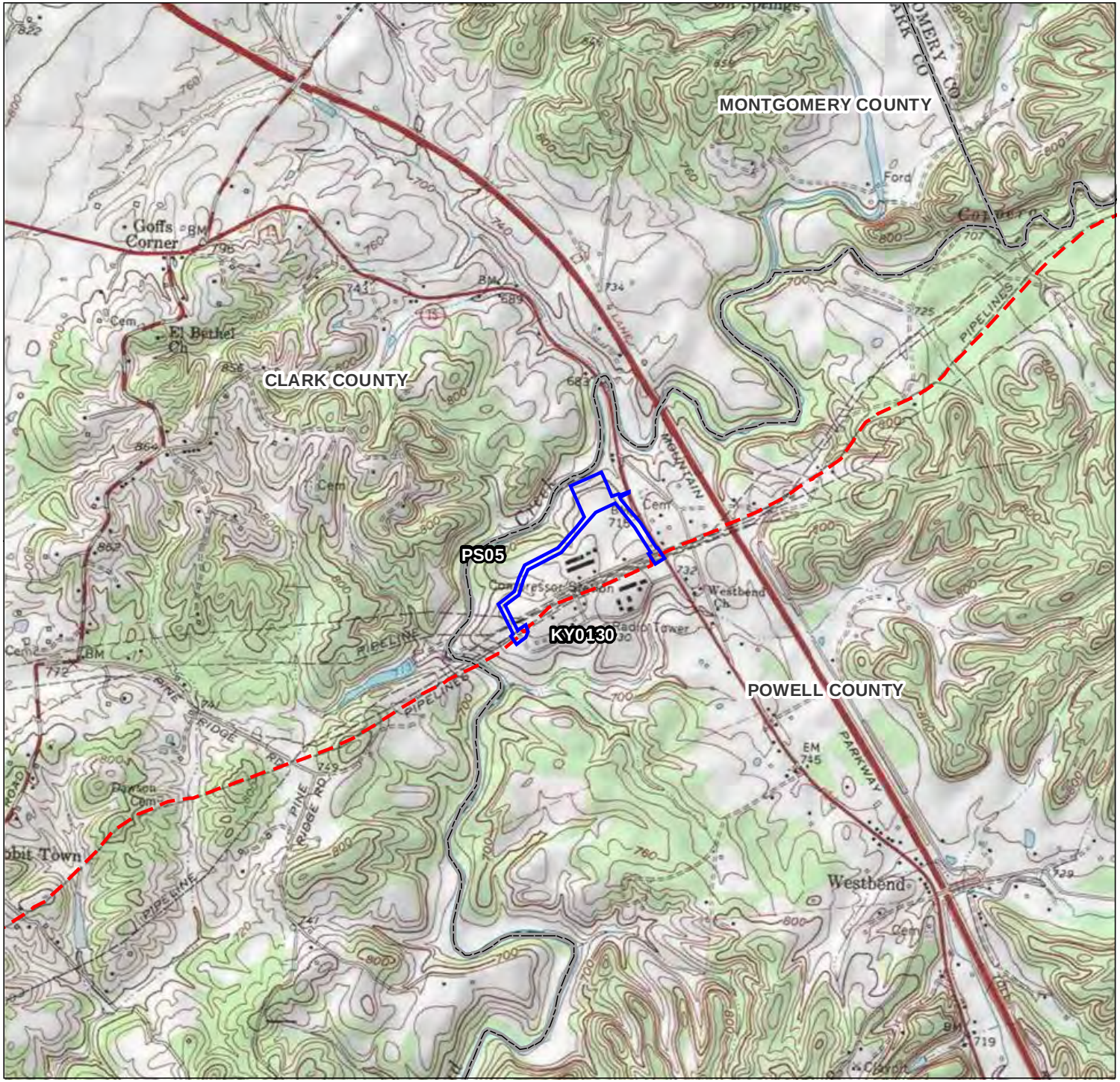


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

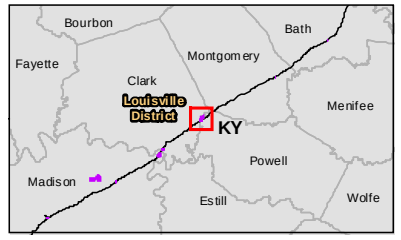
N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 17S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

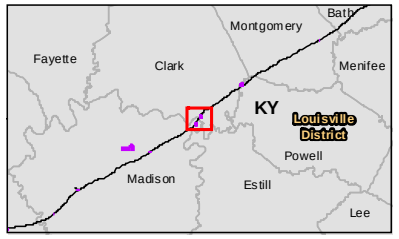
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary

Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

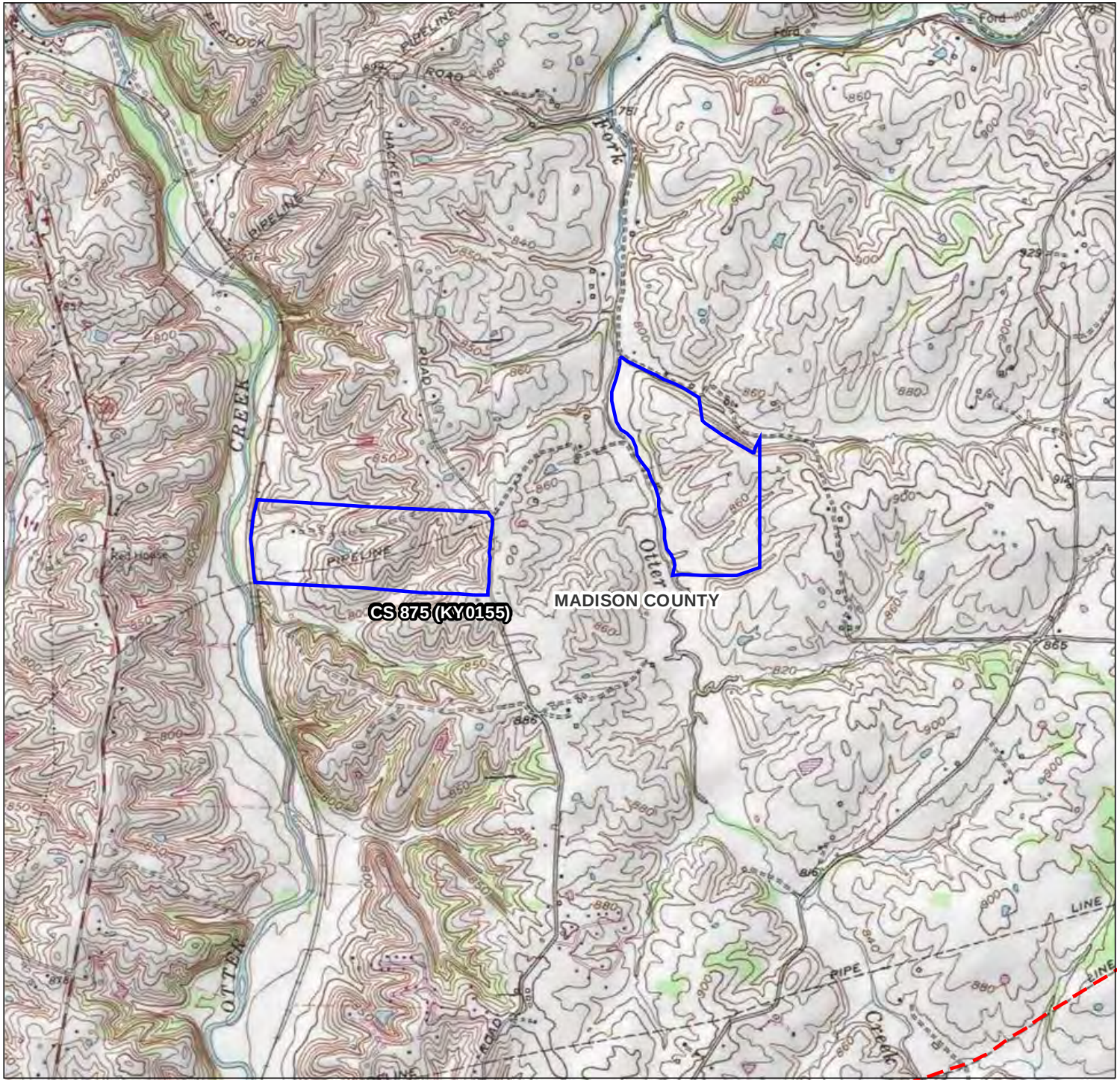


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

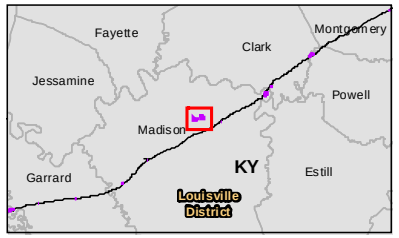
N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

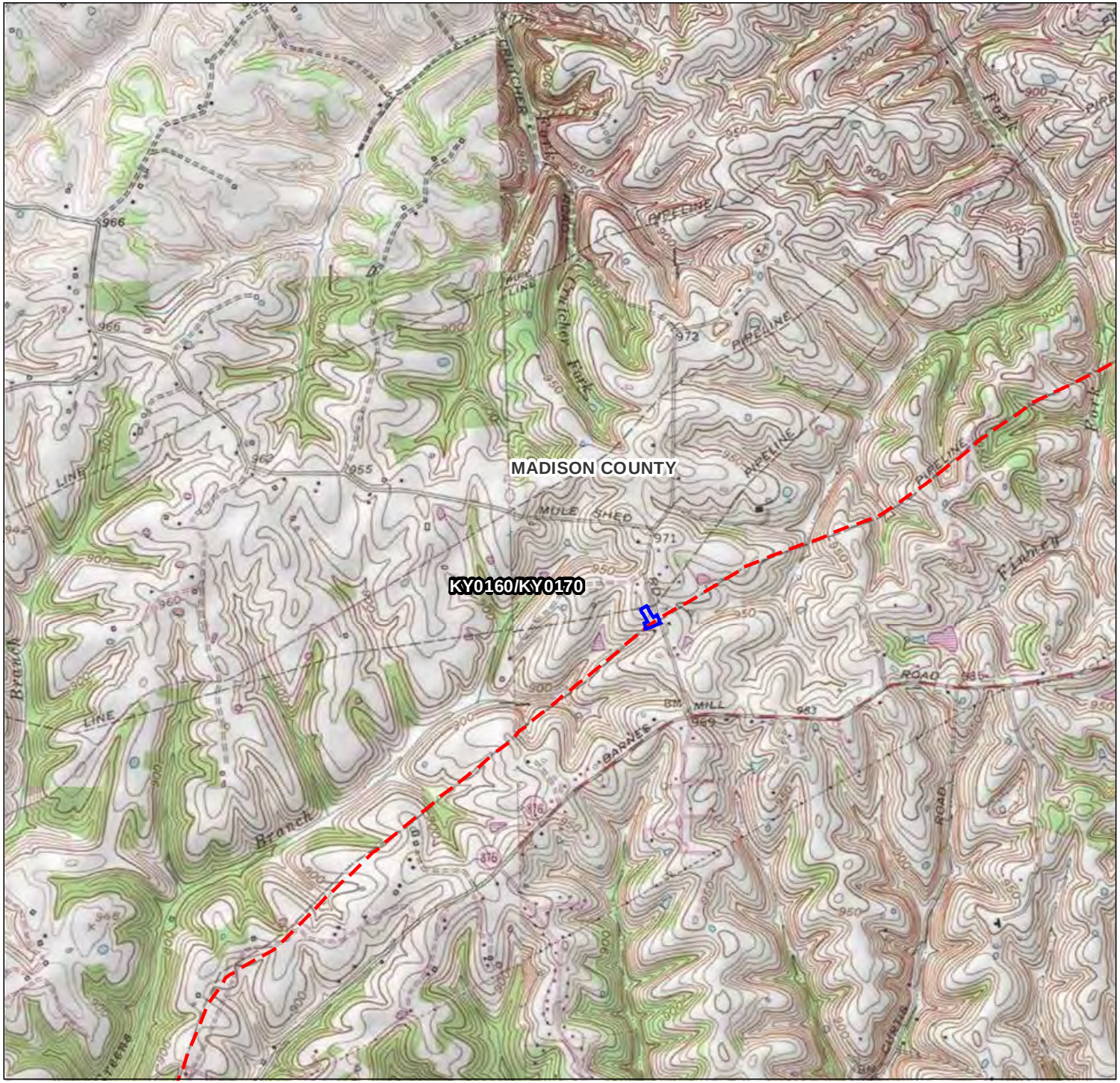


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

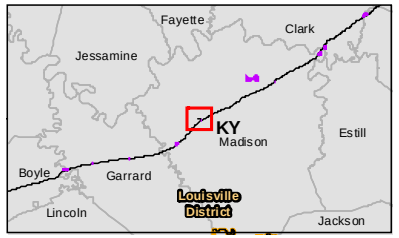
N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

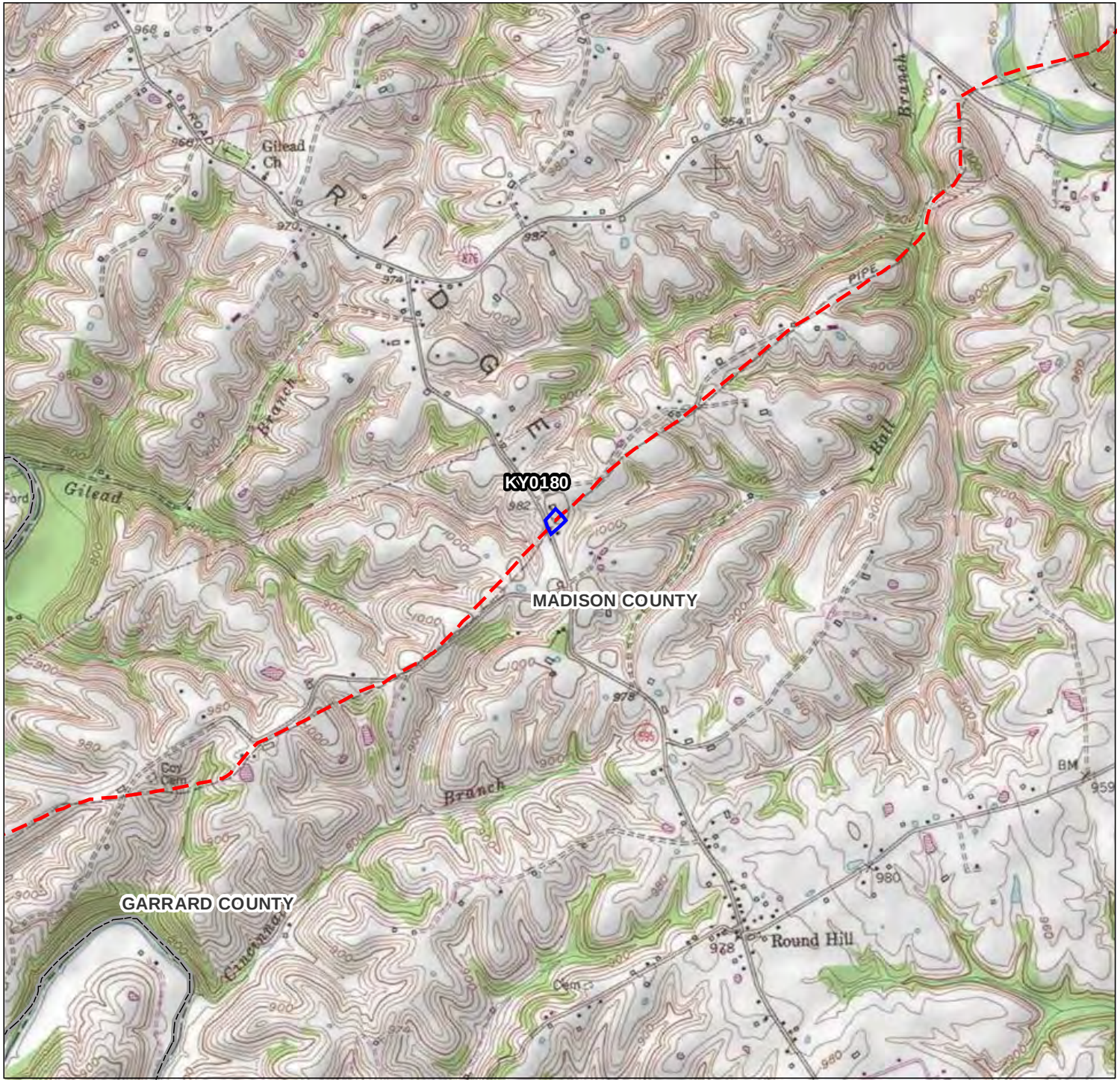


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

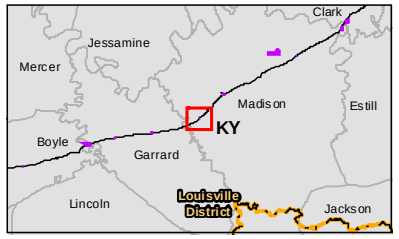
N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

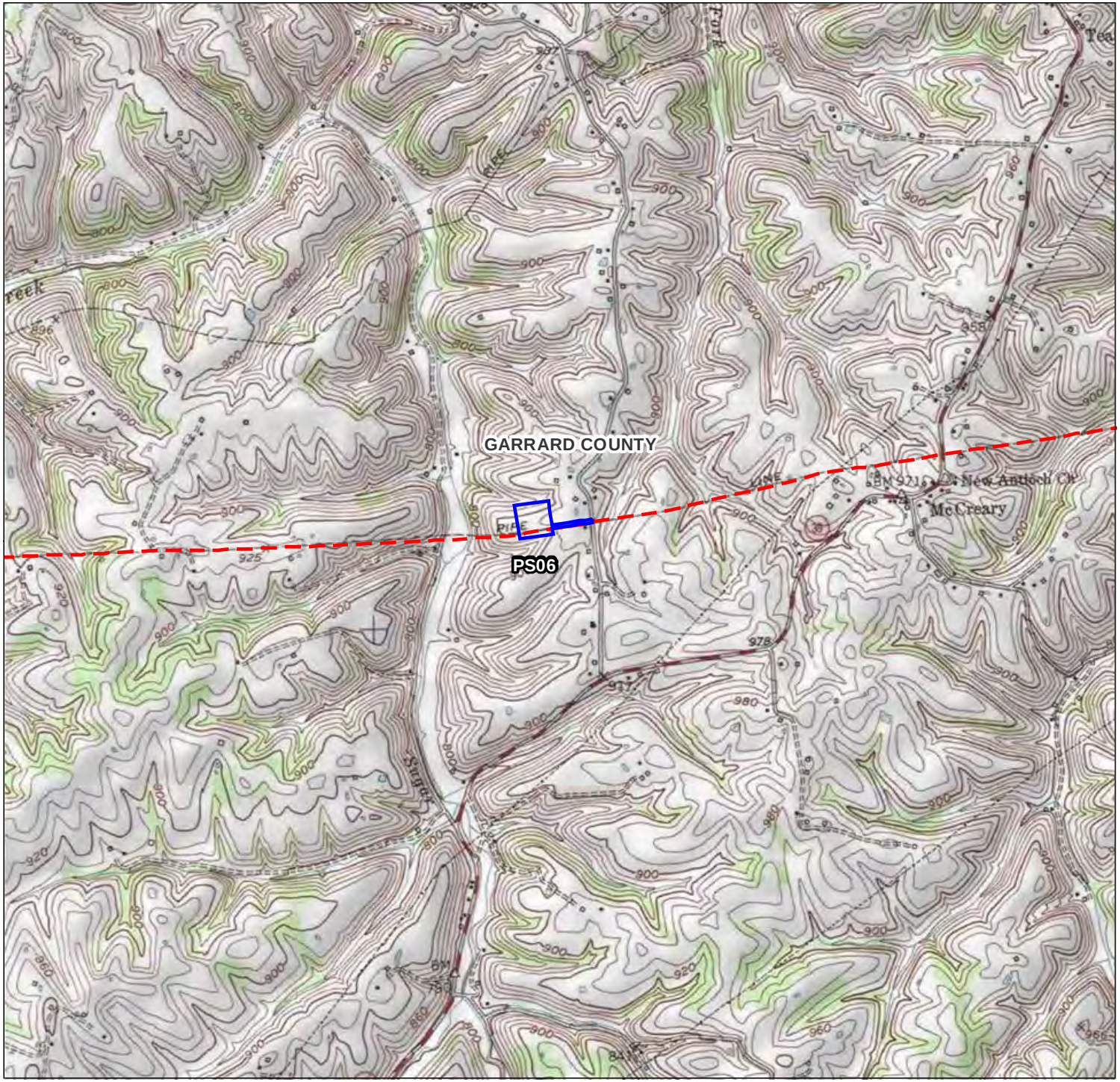


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

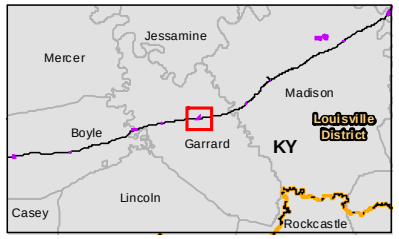
N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

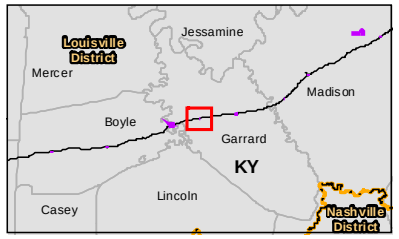
N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

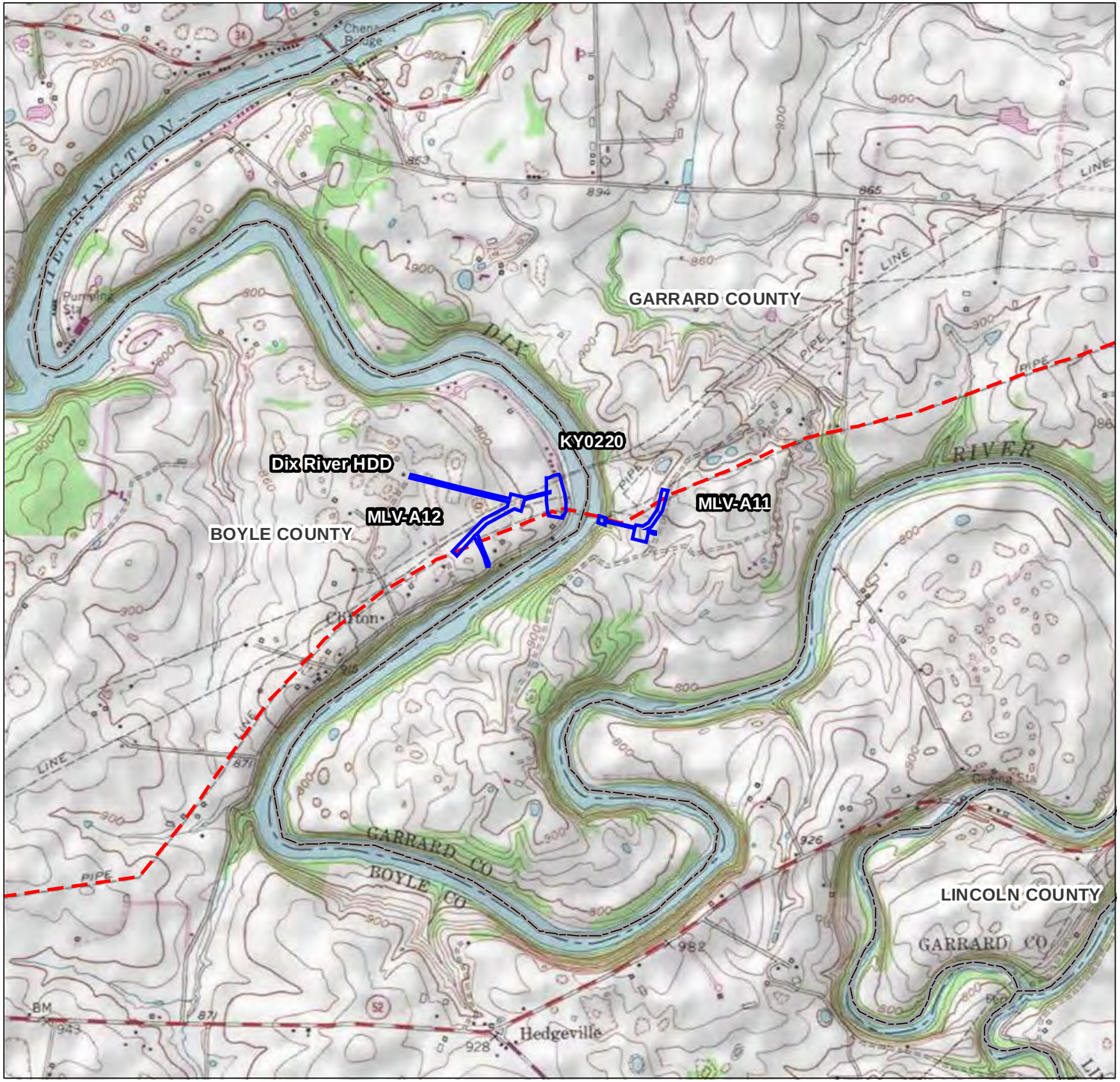


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

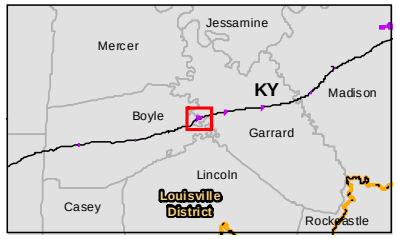
Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

0 1,000 2,000 Feet
1:24,000 (At Original document size of 8.5x11)

N

Legend
- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

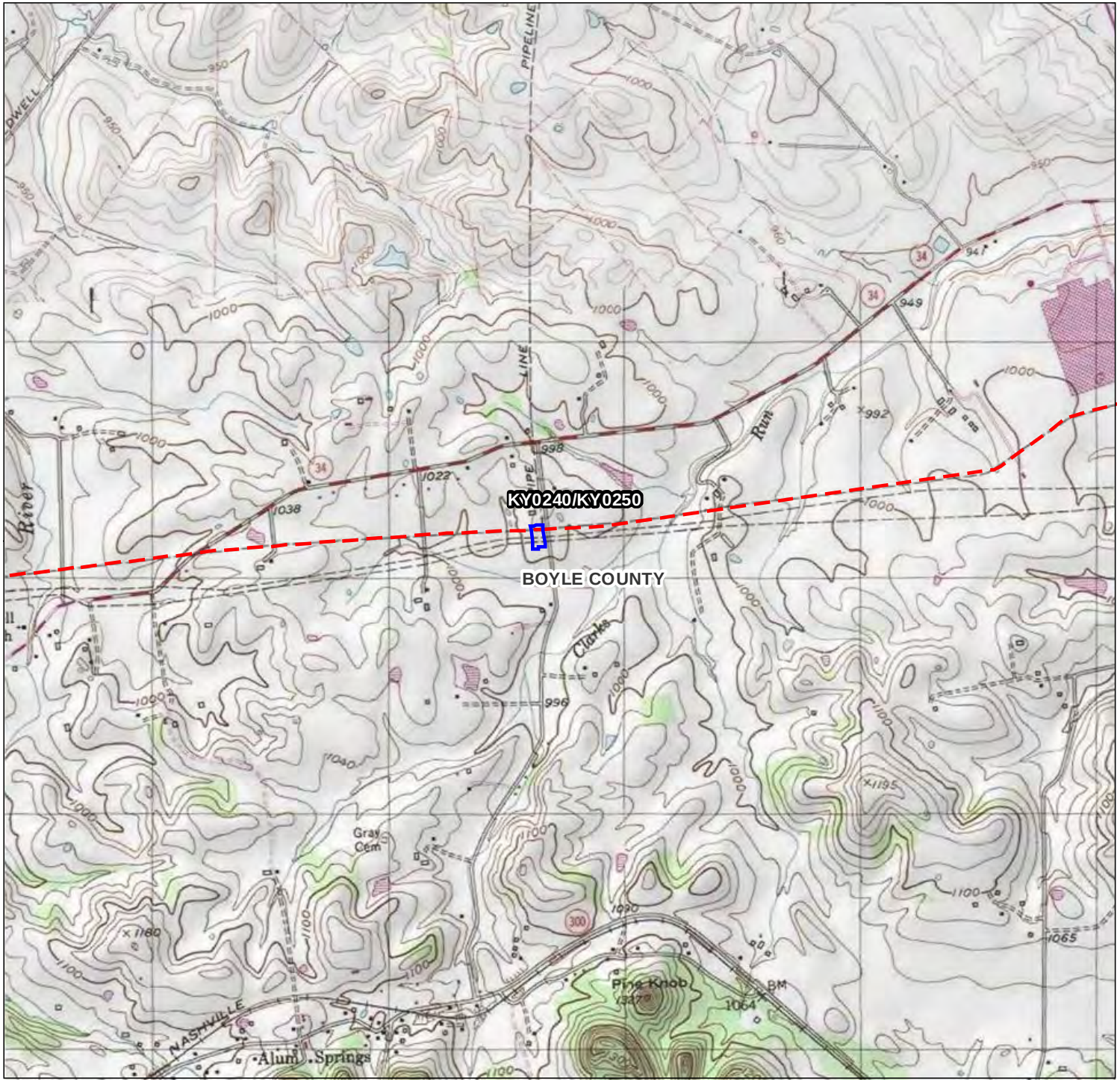


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

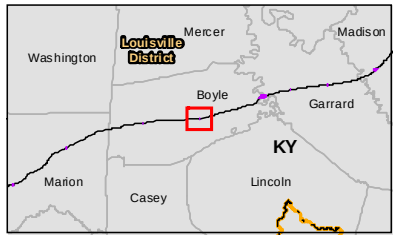
N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

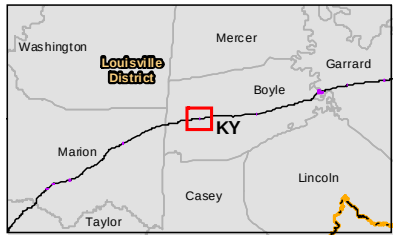
N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

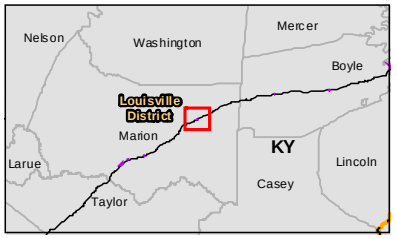
N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

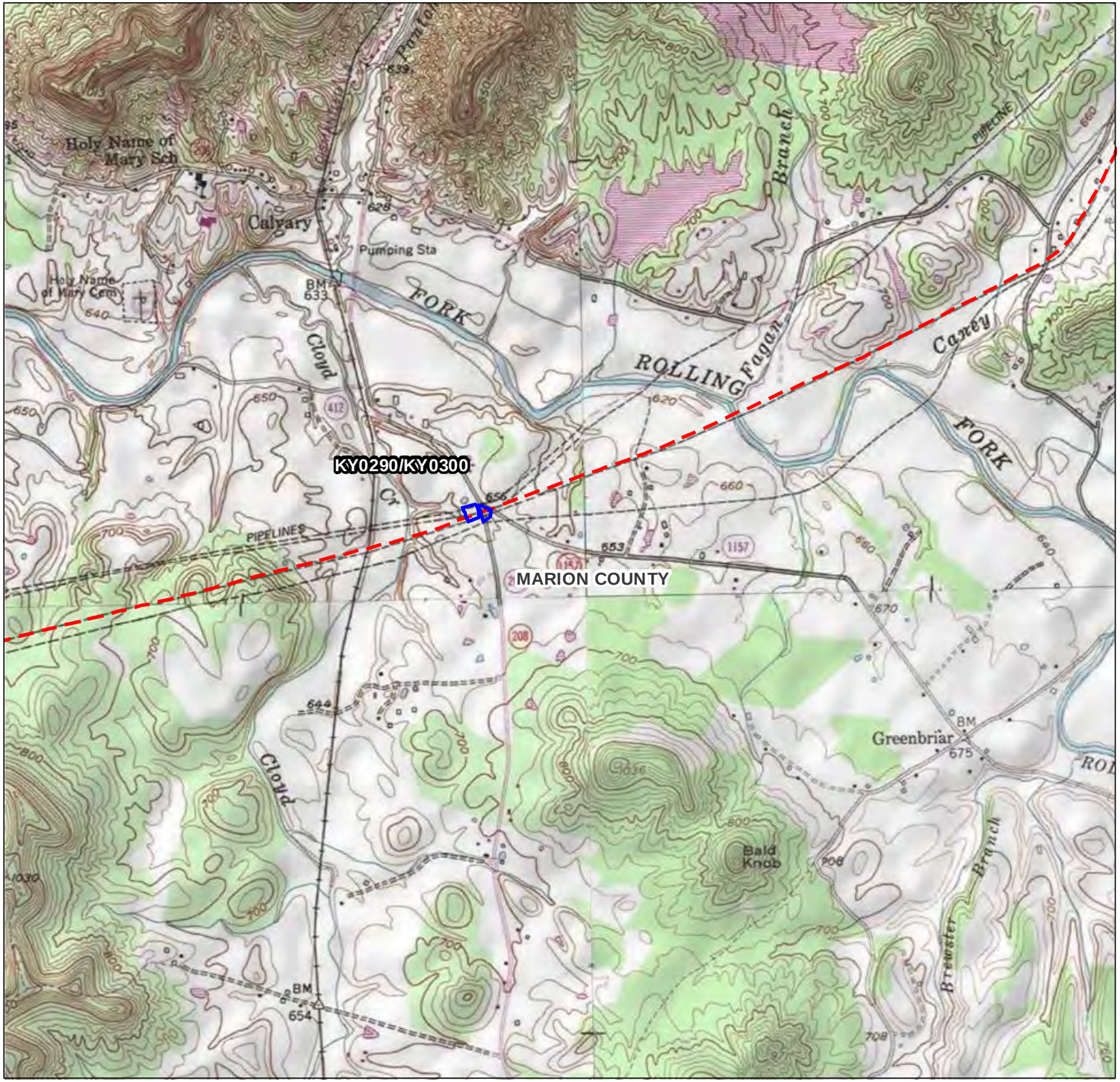


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary

Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

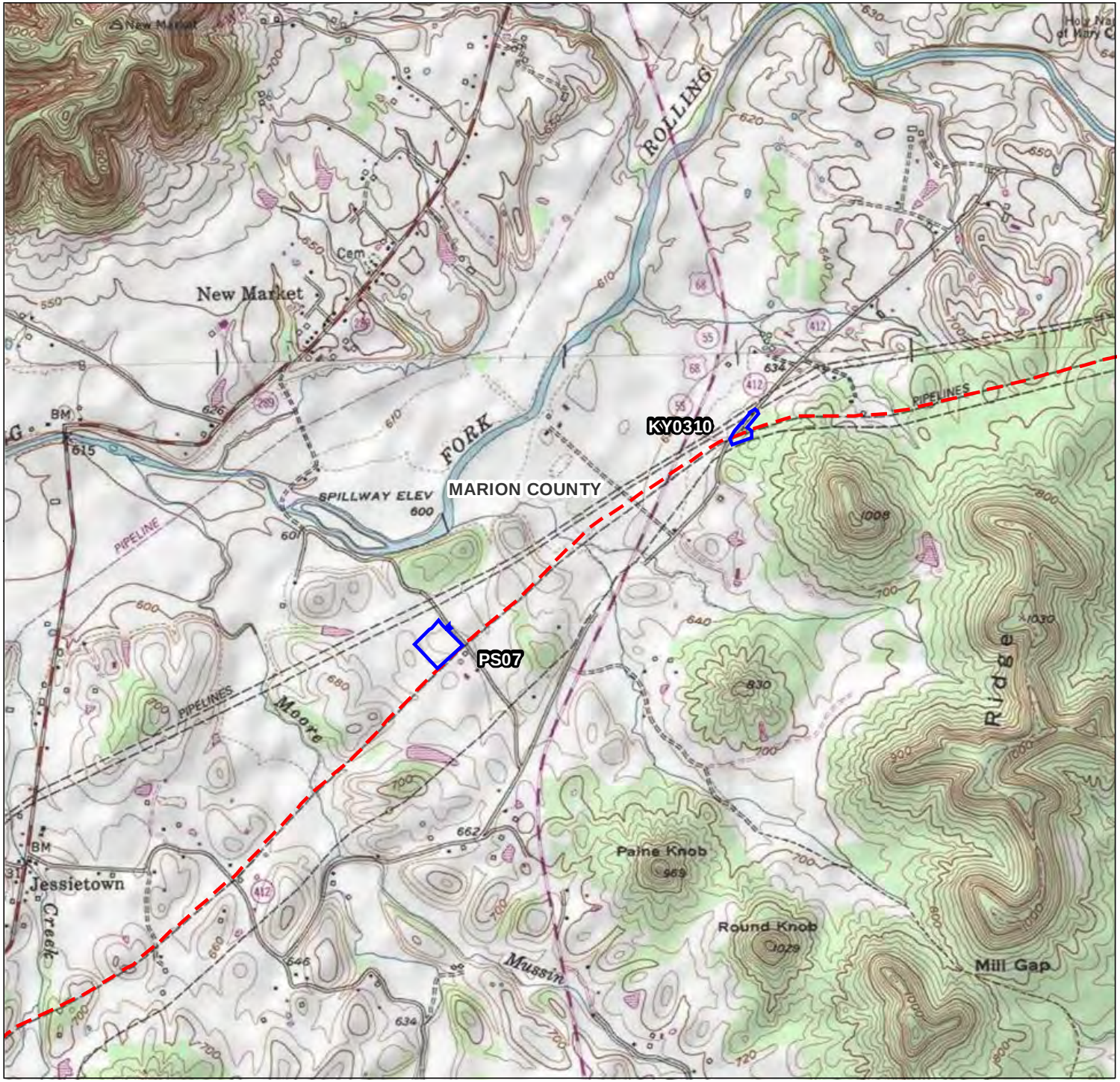


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

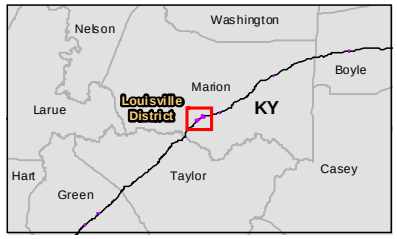
N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

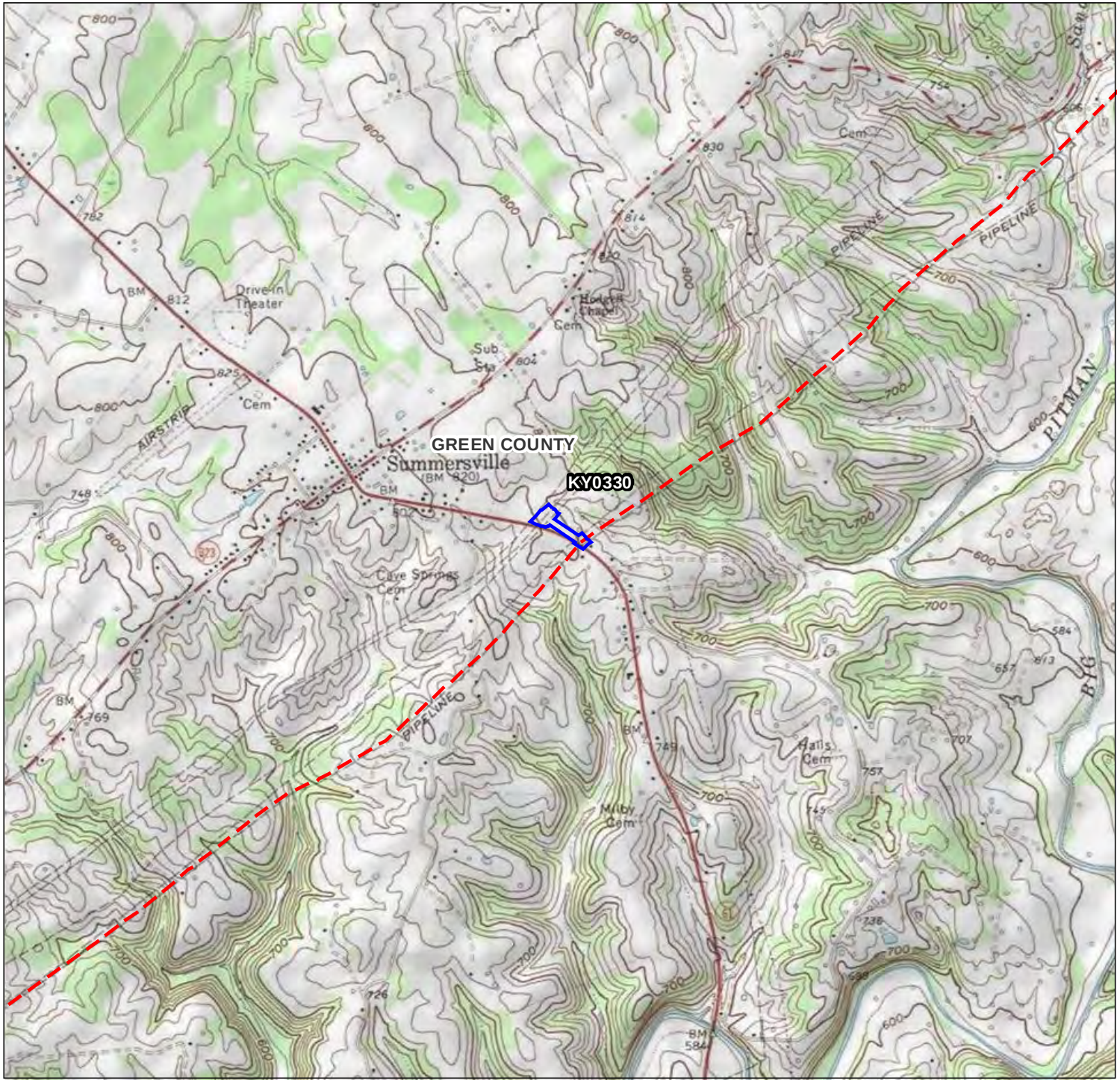


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

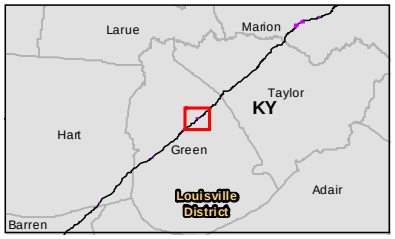
0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

N

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

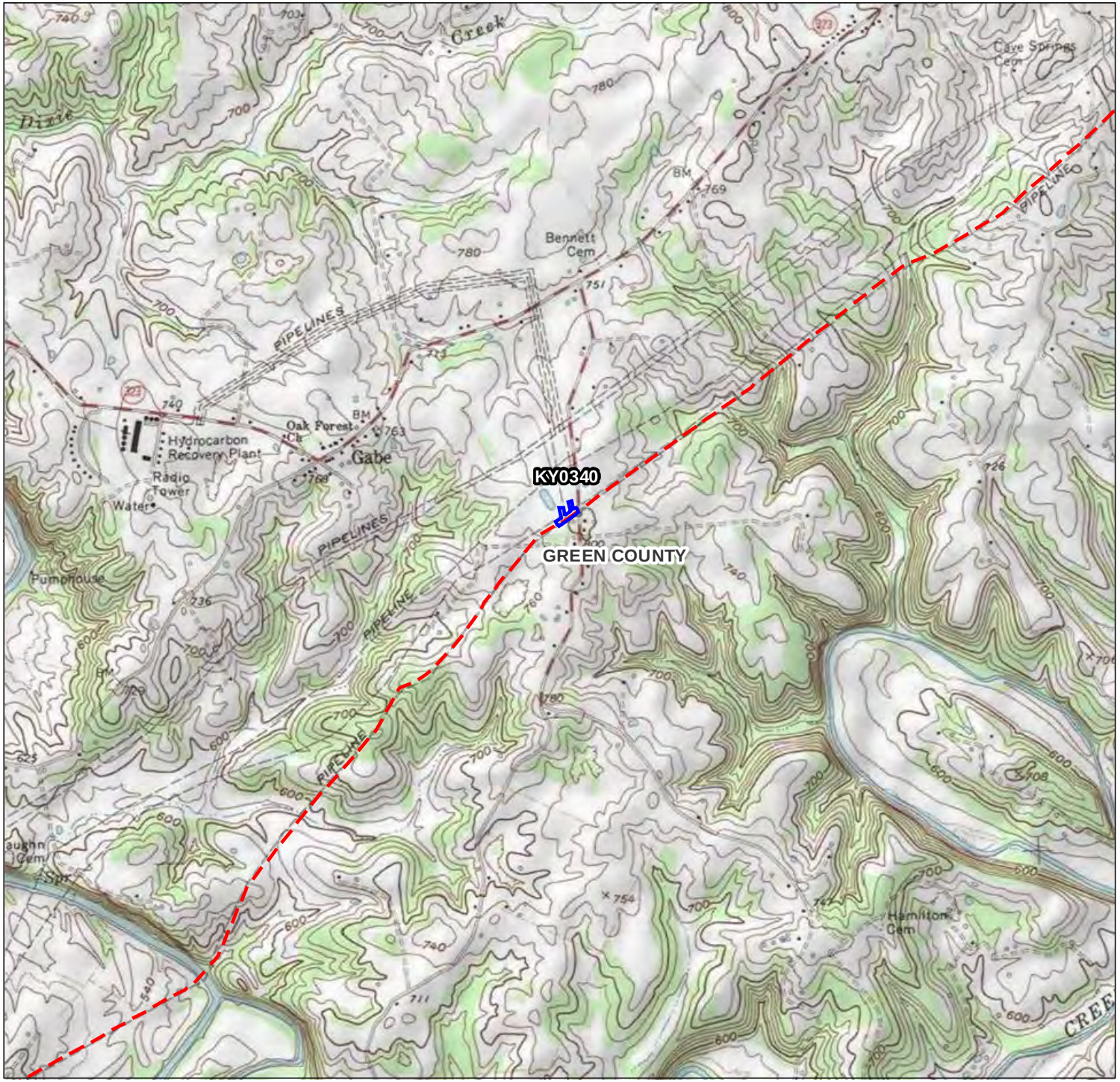


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

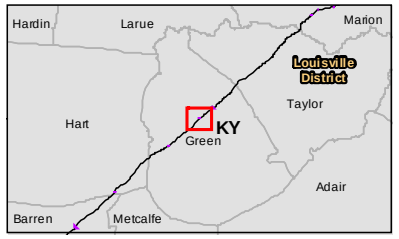
N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

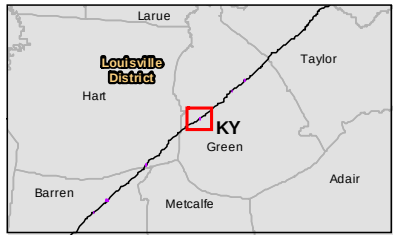
N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

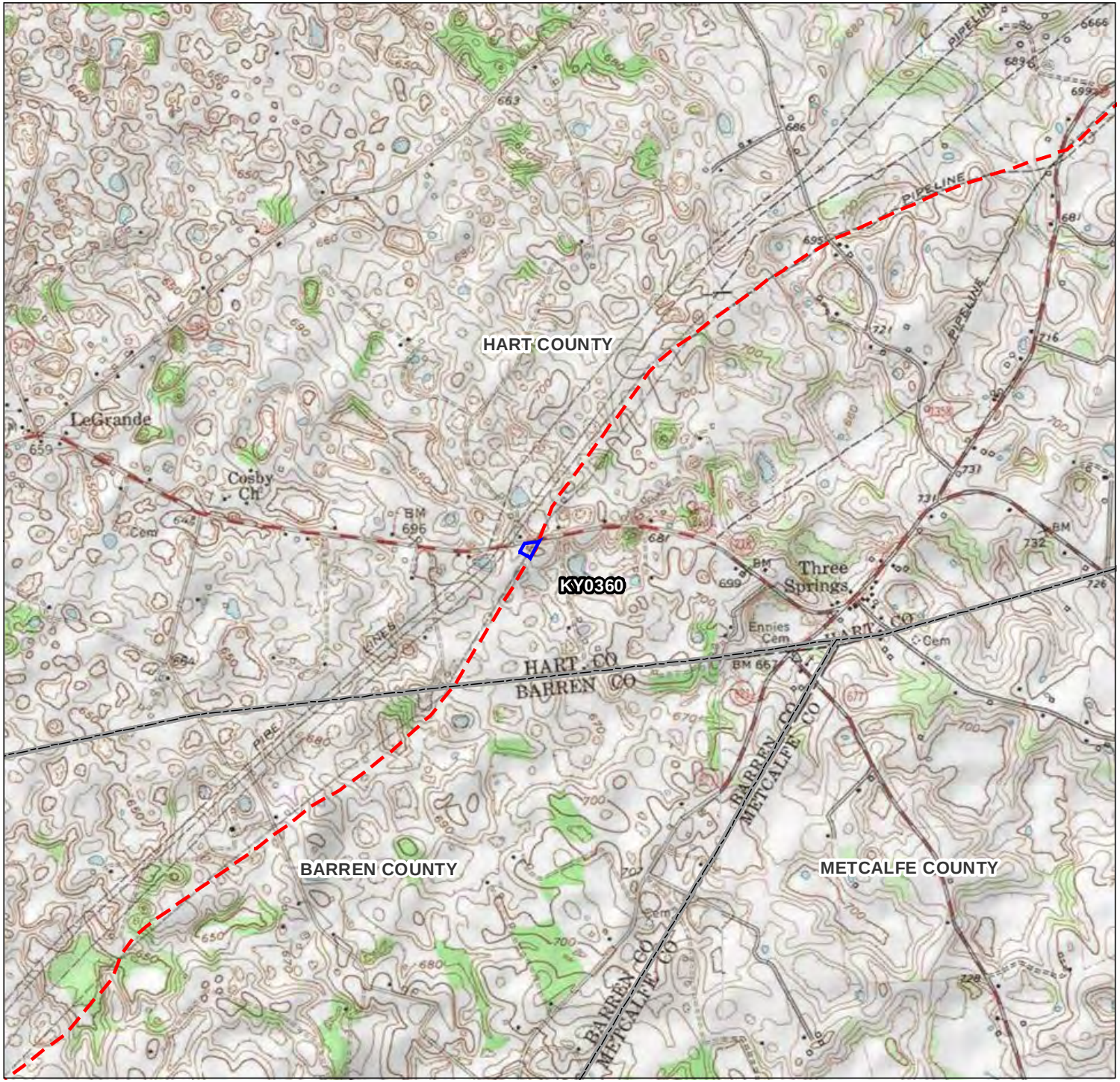


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary

Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

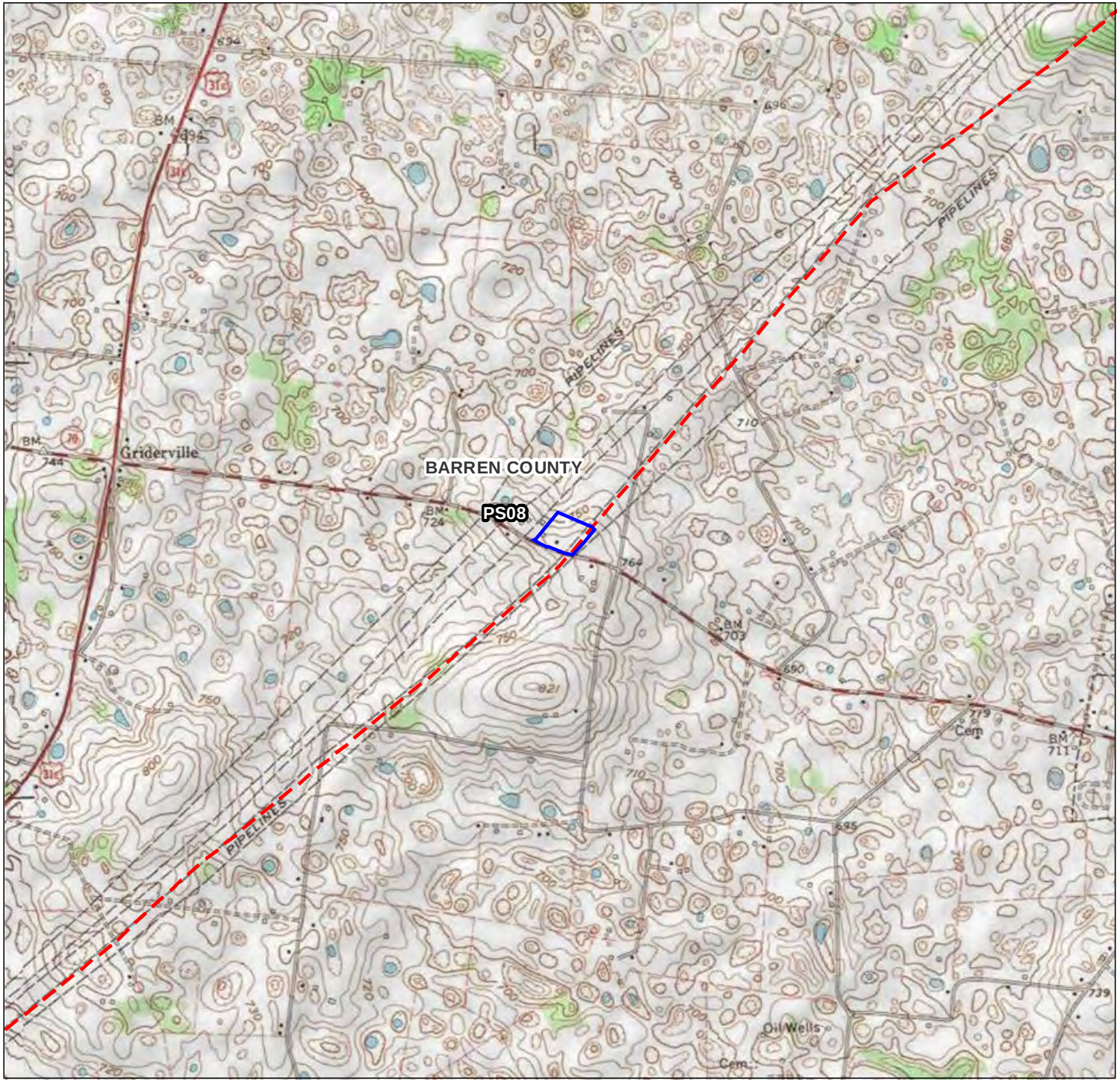


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

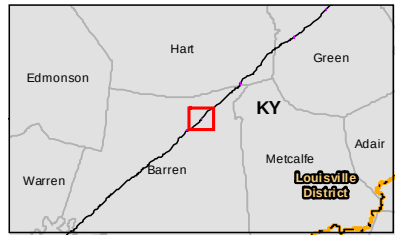
N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

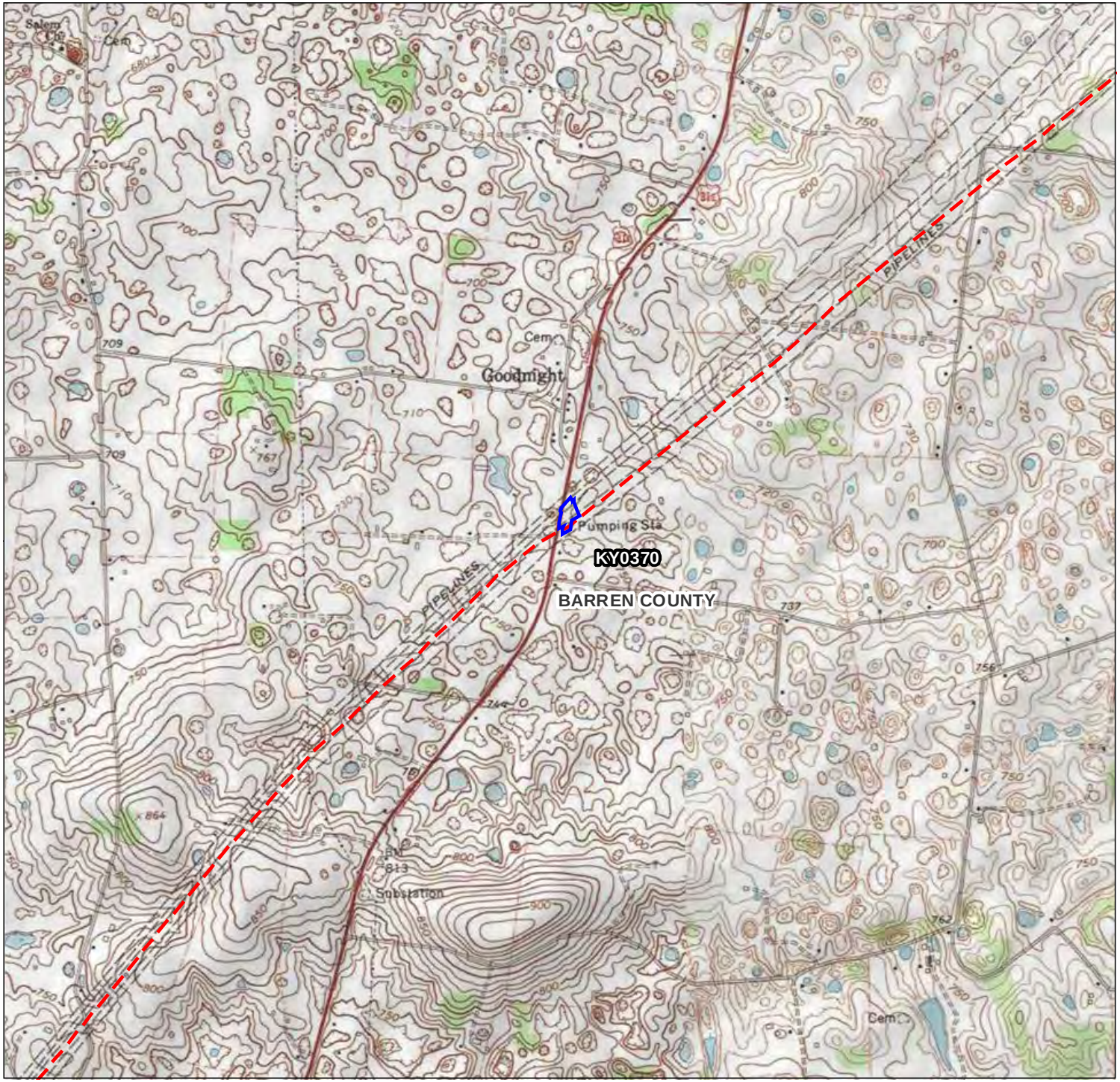


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary

Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

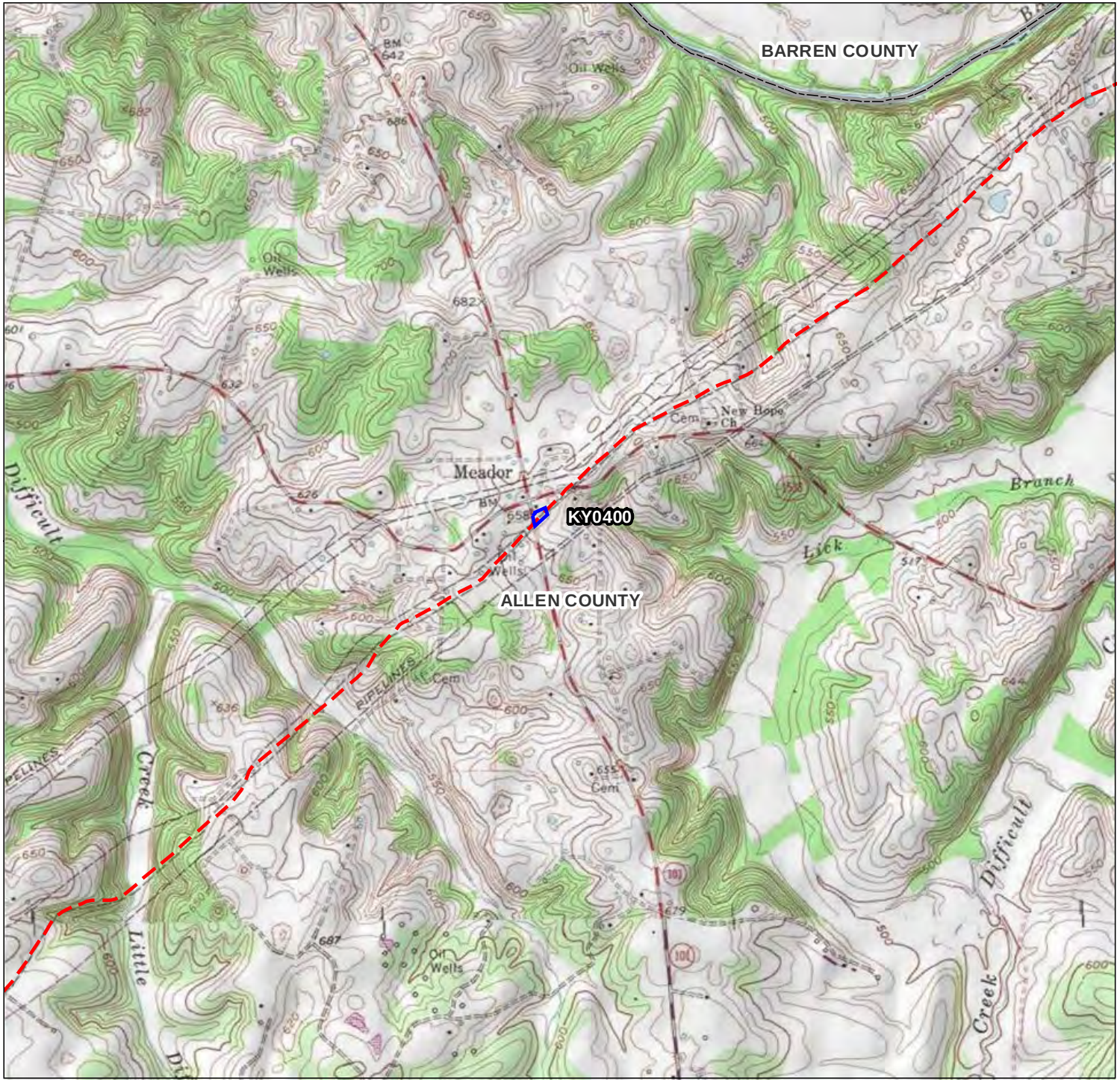


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

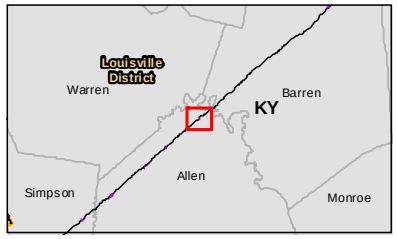
N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

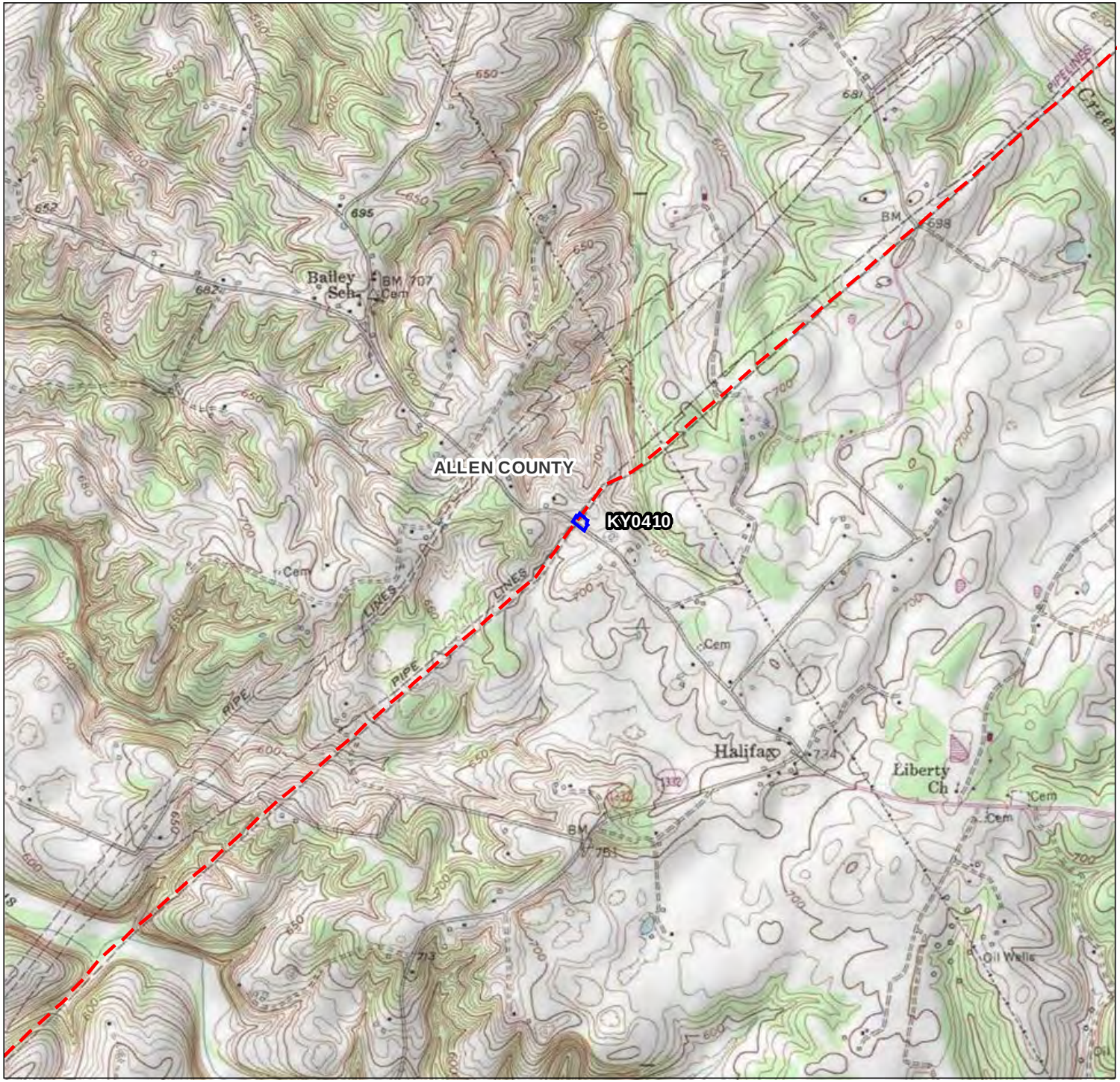


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

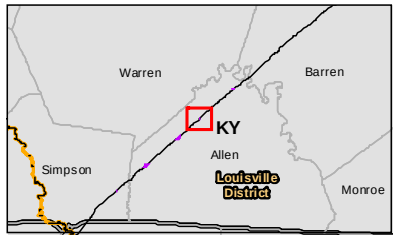
N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

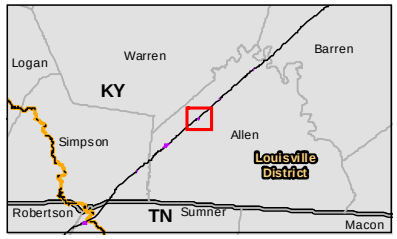
N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

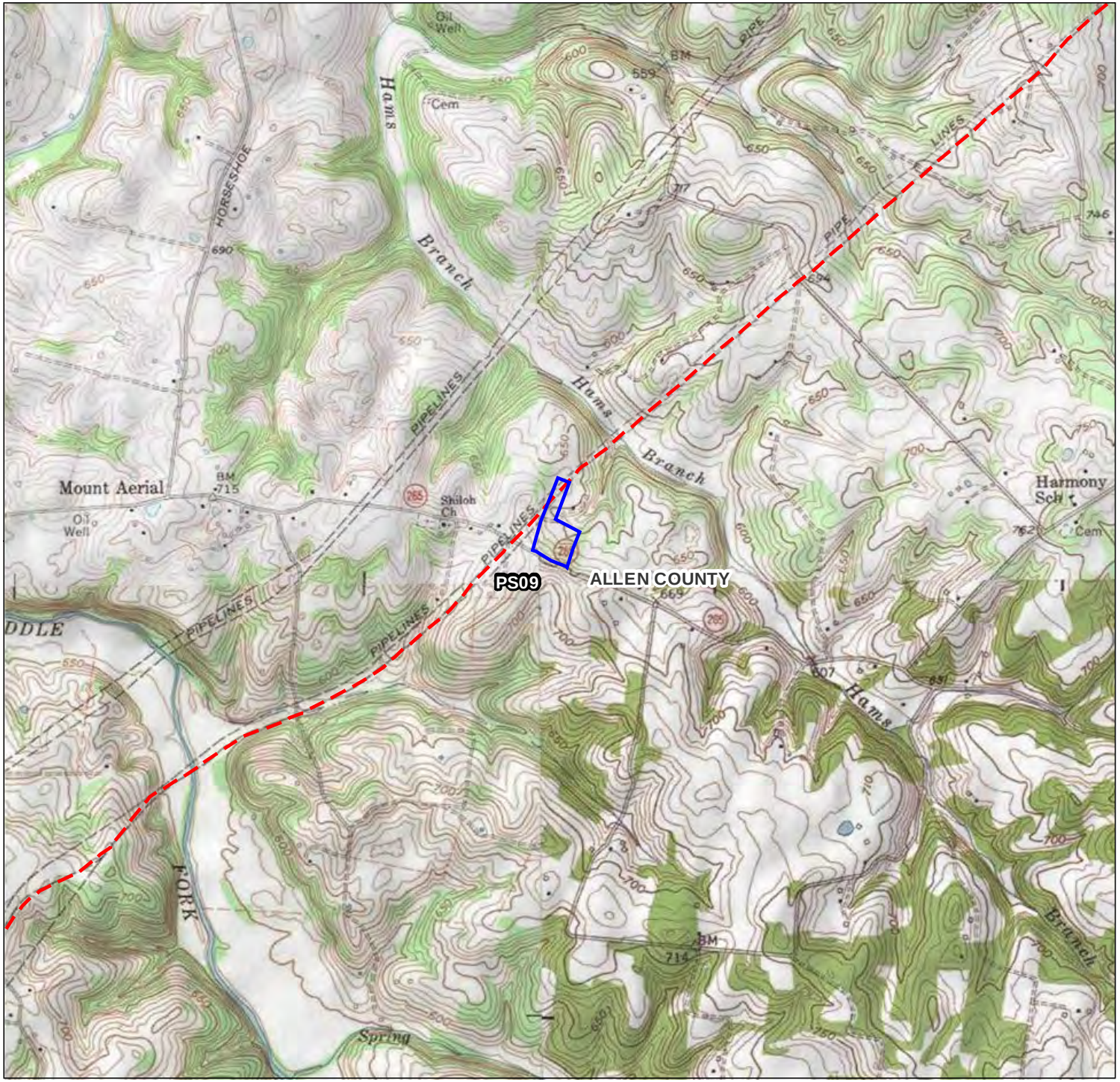


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary

Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

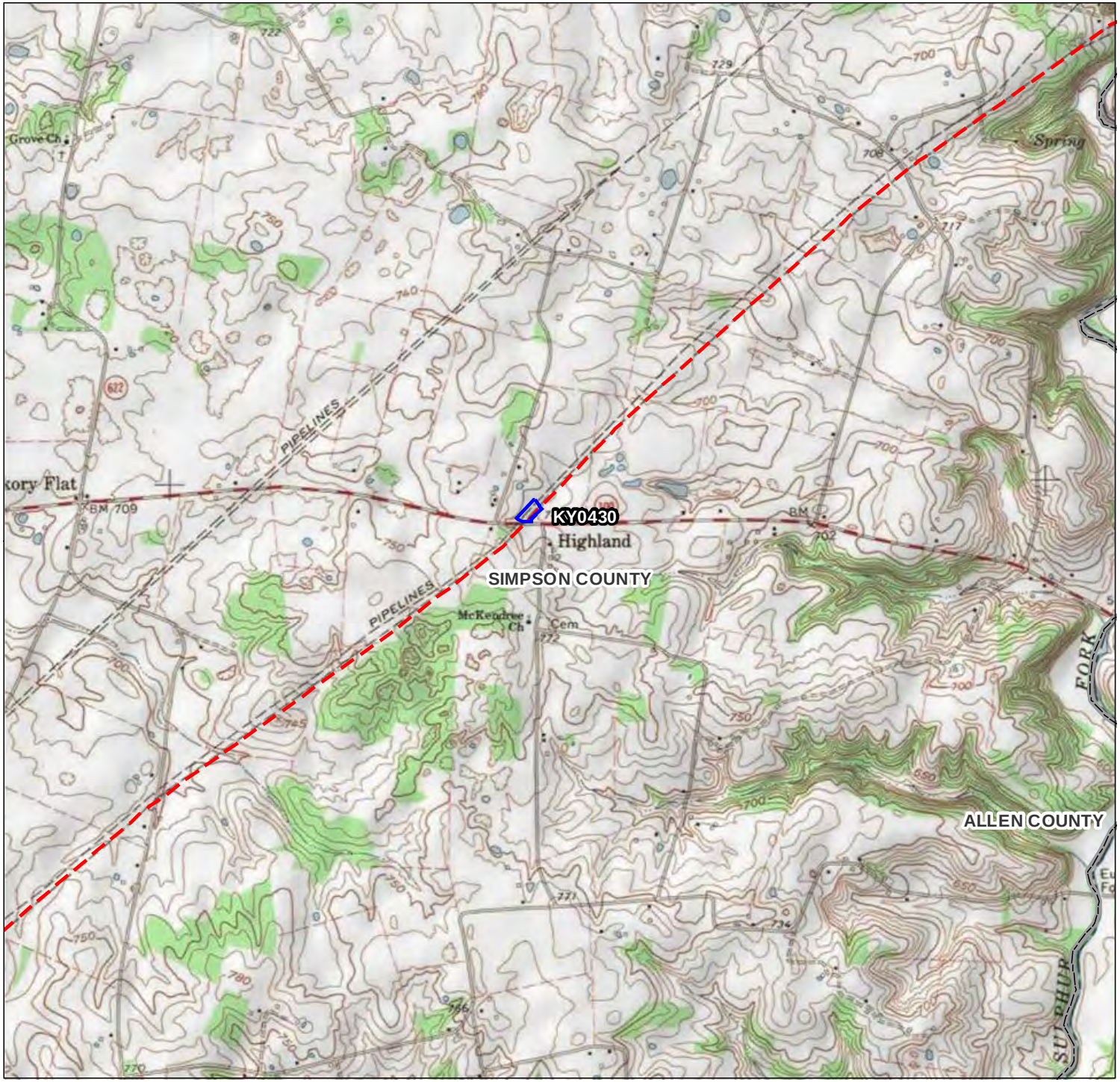


Figure No.
1

Title
Project Location and Topography

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by AB on 2015-01-13
Technical Review by MP on 2015-01-13
Independent Review by TD on 2015-01-29

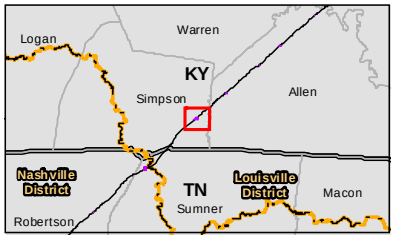
N

0 1,000 2,000 Feet

1:24,000 (At Original document size of 8.5x11)

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- USACE District Boundary



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USGS
3. Background: USGS 7.5' Topographic Quadrangles

FIGURE 2. ENVIRONMENTAL FEATURES

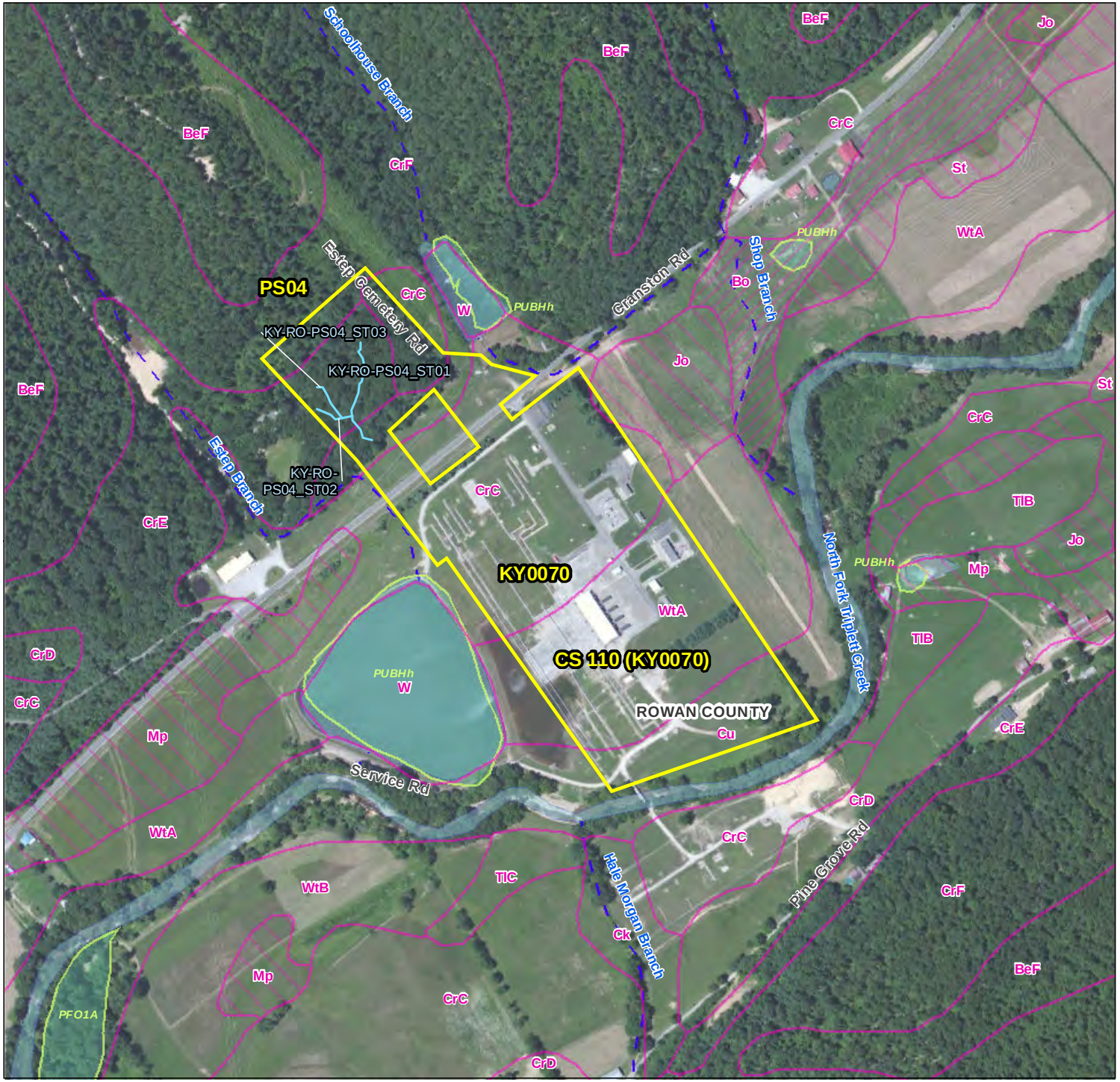


Figure No.
2

Title
Environmental Features

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by MP on 2015-01-15
Technical Review by BT on 2015-01-15
Independent Review by TD on 2015-01-29

0 250 500 Feet
1:6,000 (At Original document size of 8.5x11)

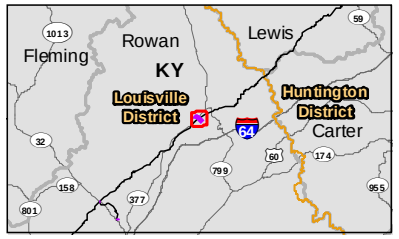
N

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- Sample Point
- Conveyance Feature
- Field Located Stream or River
- Field Located Two-Line Stream or River
- Field Located Open Water (Lake or Pond)
- Field Delineated Wetland Area
- National Wetlands Inventory
- USACE District Boundary

NRCS Soil Survey Data
- Predominantly Hydric Soils
- Partially Hydric Soils
- Non-Hydric Soils

National Hydrography Data
- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 17S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USFWS, NRCS, USGS, Esri
3. Orthophotography: World Imagery

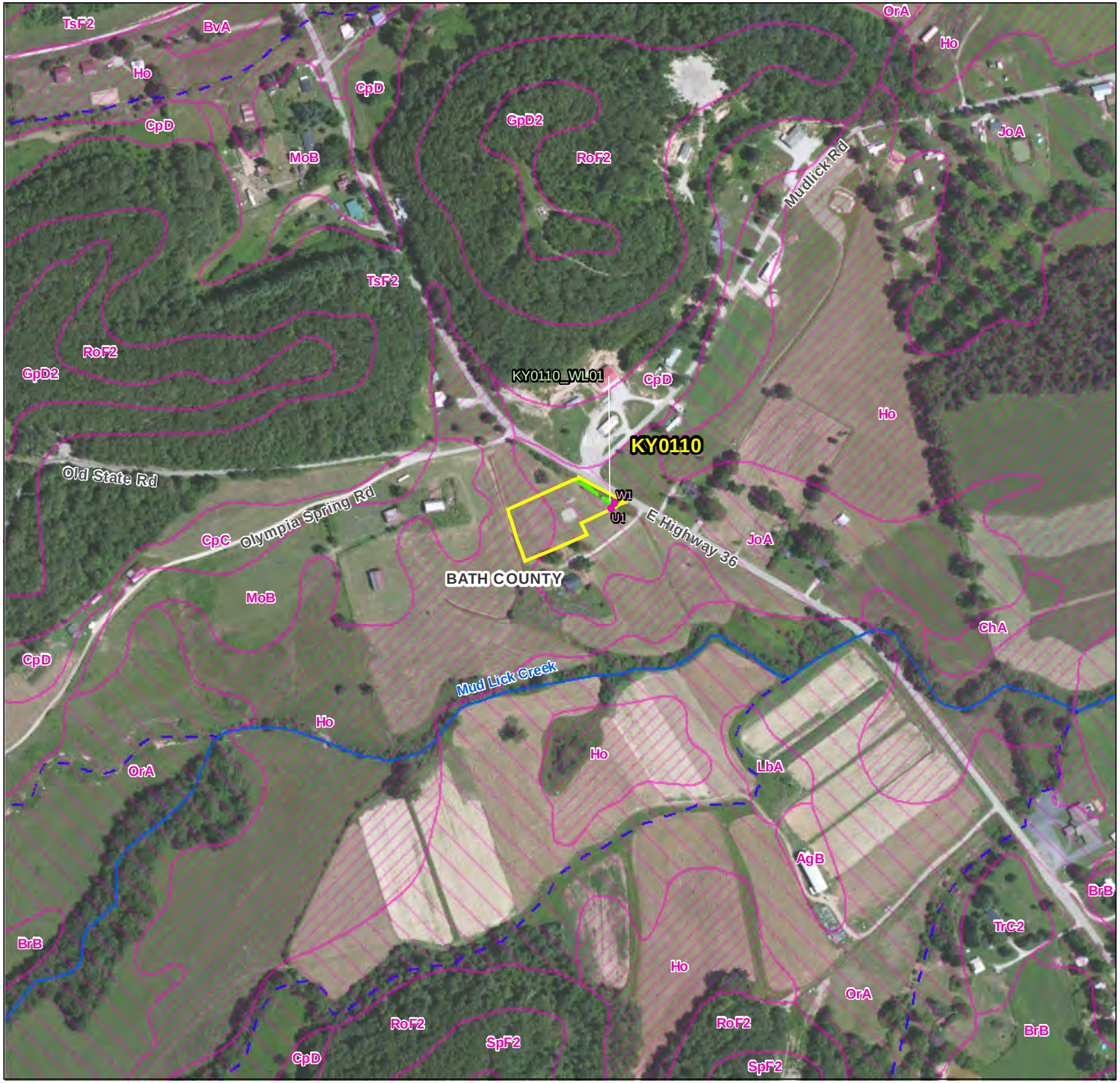


Figure No.
2

Title
Environmental Features

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by MP on 2015-01-15
Technical Review by BT on 2015-01-15
Independent Review by TD on 2015-01-29

0 250 500 Feet
1:6,000 (At Original document size of 8.5x11)

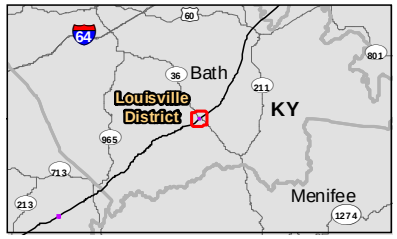
N

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- Sample Point
- Conveyance Feature
- Field Located Stream or River
- Field Located Two-Line Stream or River
- Field Located Open Water (Lake or Pond)
- Field Delineated Wetland Area
- National Wetlands Inventory
- USACE District Boundary

NRCS Soil Survey Data
- Predominantly Hydric Soils
- Partially Hydric Soils
- Non-Hydric Soils

National Hydrography Data
- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 17S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USFWS, NRCS, USGS, Esri
3. Orthophotography: World Imagery

Figure No.
2

Title
Environmental Features

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by MP on 2015-01-15
Technical Review by BT on 2015-01-15
Independent Review by TD on 2015-01-29

0 250 500 Feet
1:6,000 (At Original document size of 8.5x11)

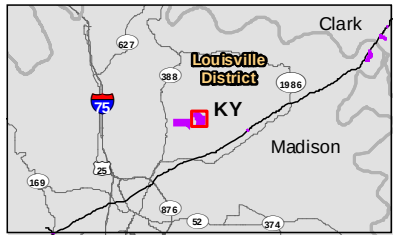
N

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- Sample Point
- Conveyance Feature
- Field Located Stream or River
- Field Located Two-Line Stream or River
- Field Located Open Water (Lake or Pond)
- Field Delineated Wetland Area
- National Wetlands Inventory
- USACE District Boundary

NRCS Soil Survey Data
- Predominantly Hydric Soils
- Partially Hydric Soils
- Non-Hydric Soils

National Hydrography Data
- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USFWS, NRCS, USGS, Esri
3. Orthophotography: World Imagery

Figure No.
2

Title
Environmental Features

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by MP on 2015-01-15
Technical Review by BT on 2015-01-15
Independent Review by TD on 2015-01-29

0 250 500 Feet
1:6,000 (At Original document size of 8.5x11)

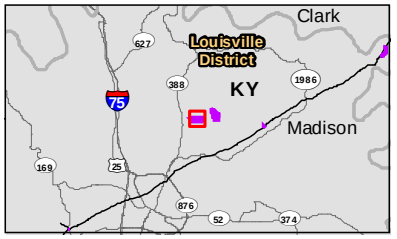
N

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- Sample Point
- Conveyance Feature
- Field Located Stream or River
- Field Located Two-Line Stream or River
- Field Located Open Water (Lake or Pond)
- Field Delineated Wetland Area
- National Wetlands Inventory
- USACE District Boundary

NRCS Soil Survey Data
- Predominantly Hydric Soils
- Partially Hydric Soils
- Non-Hydric Soils

National Hydrography Data
- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USFWS, NRCS, USGS, Esri
3. Orthophotography: World Imagery

Figure No.
2

Title
Environmental Features

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by MP on 2015-01-15
Technical Review by BT on 2015-01-15
Independent Review by TD on 2015-01-29

0 250 500 Feet
1:6,000 (At Original document size of 8.5x11)

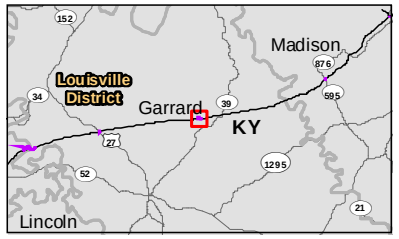
N

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- Sample Point
- Conveyance Feature
- Field Located Stream or River
- Field Located Two-Line Stream or River
- Field Located Open Water (Lake or Pond)
- Field Delineated Wetland Area
- National Wetlands Inventory
- USACE District Boundary

NRCS Soil Survey Data
- Predominantly Hydric Soils
- Partially Hydric Soils
- Non-Hydric Soils

National Hydrography Data
- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USFWS, NRCS, USGS, Esri
3. Orthophotography: World Imagery

Figure No.
2

Title
Environmental Features

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by MP on 2015-01-15
Technical Review by BT on 2015-01-15
Independent Review by TD on 2015-01-29

0 250 500 Feet
1:6,000 (At Original document size of 8.5x11)

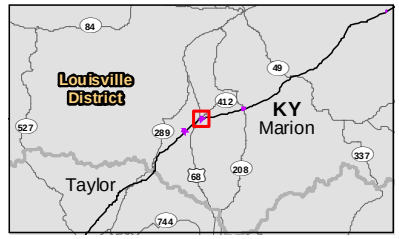
N

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- Sample Point
- Conveyance Feature
- Field Located Stream or River
- Field Located Two-Line Stream or River
- Field Located Open Water (Lake or Pond)
- Field Delineated Wetland Area
- National Wetlands Inventory
- USACE District Boundary

NRCS Soil Survey Data
- Predominantly Hydric Soils
- Partially Hydric Soils
- Non-Hydric Soils

National Hydrography Data
- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody



Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USFWS, NRCS, USGS, Esri
3. Orthophotography: World Imagery

Figure No.
2

Title
Environmental Features

Client/Project
Tennessee Gas Pipeline Company, L.L.C.
Abandonment and Capacity Restoration Project
Utica Marcellus Texas Pipeline LLC
Utica Marcellus Texas Pipeline Project

Project Location
State: Kentucky
USACE District: Louisville

Prepared by MP on 2015-01-15
Technical Review by BT on 2015-01-15
Independent Review by TD on 2015-01-29

0 250 500 Feet
1:6,000 (At Original document size of 8.5x11)

N

Legend

- Existing Pipeline
- New Build Centerlines
- Survey Corridor
- Sample Point
- Conveyance Feature
- Field Located Stream or River
- Field Located Two-Line Stream or River
- Field Located Open Water (Lake or Pond)
- Field Delineated Wetland Area
- National Wetlands Inventory
- USACE District Boundary

NRCS Soil Survey Data
- Predominantly Hydric Soils
- Partially Hydric Soils
- Non-Hydric Soils

National Hydrography Data
- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Notes
1. Coordinate System: GCS North American 1983 UTM Zone 16S (Calculated)
2. Data Sources Include: Kinder Morgan, HMM, Stantec, USFWS, NRCS, USGS, Esri
3. Orthophotography: World Imagery

Appendix B Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: TGPCON City/County: Bath Sampling Date: 11/5/2013 5:36:41 PM

Applicant/Owner: KINDER MORGAN State: KY Sampling Point: KY0110_WL1_W1

Investigator(s): CWF Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): CL

Slope (%): 3 - 7% Lat: 38.06176 Long: -83.672723 Datum: NAD 83

Soil Map Unit Name: Johnsburg silt loam, 0 to 4 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** _____
Hydric Soil Present?	Yes _____	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

PEM. Sample point within roadside ditch - soil sample not collected; soils assumed hydric.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 1.00	
Water Table Present?	Yes ✓	No _____	Depth (inches): 0.00	
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0.00	**Wetland Hydrology Present?** **Yes** ✓ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: KY0110_WL1_W1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover: 0			
50% of total cover: 0	20% of total cover: 0		
Sapling Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover: 0			
50% of total cover: 0	20% of total cover: 0		
Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover: 0			
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 5)			
1. Cyperus esculentus	55	Yes	FACW
2. Juncus effusus	15	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
Total Cover: 70			
50% of total cover: 35	20% of total cover: 14		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
Total Cover: 0			
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	70	x 2 =	140
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	70 (A)		140 (B)

Prevalence Index = B/A = 2

Hydrophytic Vegetation Indicators:

- ✓ 1- Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: KY0110_WL1_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coastal Prairie Redox (A16) (MLRA 147, 148)
- ___ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ___

Remarks: Sample point within roadside ditch - soil sample not collected; soils assumed hydric.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: TGPCON City/County: Bath Sampling Date: 11/5/2013 5:24:37 PM

Applicant/Owner: KINDER MORGAN State: KY Sampling Point: KY0110_WL1_U1

Investigator(s): CWF Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): VV

Slope (%): 3 - 7% Lat: 38.061718 Long: -83.672753 Datum: NAD 83

Soil Map Unit Name: Johnsburg silt loam, 0 to 4 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Open pasture.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: KY0110_WL1_U1

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover: 0			
50% of total cover: 0	20% of total cover: 0		
Sapling Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover: 0			
50% of total cover: 0	20% of total cover: 0		
Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover: 0			
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 5)			
1. Trifolium pratense	60	Yes	FACU
2. Andropogon virginicus	10	No	FACU
3. Setaria pumila	10	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
Total Cover: 80			
50% of total cover: 40	20% of total cover: 16		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
Total Cover: 0			
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	10	x 3 =	30
FACU species	70	x 4 =	280
UPL species	0	x 5 =	0
Column Totals:	80 (A)		310 (B)

Prevalence Index = B/A = 3.88

Hydrophytic Vegetation Indicators:

___ 1- Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: KY0110_WL1_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 4/4	100					SIL	
4 - 20	10YR 5/3	80	5Y 6/2	15.00	D	M	SIL	
			5YR 5/6	5.00	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coastal Prairie Redox (A16) (MLRA 147, 148)
- ___ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): 0.00

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site:	Utica Marcellus Texas Pipeline Project		Stantec Project #:	172673073	
Applicant:	Kinder Morgan				
Investigator #1:	AF	Investigator #2:	JM		
Soil Unit:	Brassfield silt loam, 12 to 30 percent slopes		NWI Classification:	N/A	
Landform:	Toeslope	Local Relief:	Concave		
Slope (%):	2	Latitude: 37.811895	Longitude:	-84.240054363713	Datum: NAD83

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☐ , Soil ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

Date:	08/12/14
County:	Madison
State:	KY
Wetland ID:	KY-CS875_WL01
Sample Point:	W1
Subregion:	LRR N
Community:	PFO

Section, Township, Range: N/A

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☑ Yes ☐ No	Hydric Soils Present?	☑ Yes ☐ No
Wetland Hydrology Present?	☑ Yes ☐ No	Is This Sampling Point Within A Wetland?	☑ **Yes** ☐ **No**

Remarks: A WETS analysis indicates the hydrologic conditions of the site predeing the investigation were within normal range.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☑ A1 - Surface Water
- ☑ A2 - High Water Table
- ☑ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B14 - True Aquatic Plants
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☑ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth:	2	(in.)
Water Table Present?	☑ Yes ☐ No	Depth:	0	(in.)
Saturation Present?	☑ Yes ☐ No	Depth:	0	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks:

SOILS

Map Unit Name: Brassfield silt loam, 12 to 30 percent slopes

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Redox Features Color (Moist)		Redox Features %	Redox Features Type	Redox Features Location	Texture (e.g. clay, sand, loam)
0	1	1	10YR	4/2	100	--	--	--	--	--	silty clay loam
1	12	2	10YR	5/1	85	10YR	4/6	15	C	M	silty clay loam
12	20	3	10YR	5/3	90	10YR	4/6	10	C	M	silty clay loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A10 - 2 cm Muck (LRR N)
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral (LRR N, MLRA 147, 148)
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface
- ☐ S8 - Polyvalue Below Dark Surface (MLRA 147, 148)
- ☐ S9 - Thin Dark Surface (MLRA 147, 148)
- ☐ F2 - Loamy Gleyed Matrix
- ☑ F3 - Depleted Matirx
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions
- ☐ F12 - Iron-Manganese Masses (LRR N, MLRA 136)
- ☐ F13 - Umbric Surface (MLRA 122, 136)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 148)
- ☐ F21 - Red Parent Material (MLRA 127, 147)

Indicators for Problematic Soils [1]
- ☐ A10 - 2cm Muck (MLRA 147)
- ☐ A16 - Coast Prairie Redox (MLRA 147, 148)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 136, 147)
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site: Utica Marcellus Texas Pipeline Project Wetland ID: KY-CS875_WL01 Sample Point **W1**

VEGETATION

Tree Stratum (Plot size: 30 ft radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Fraxinus pennsylvanica*	50	Y	FACW
2.	*Ulmus americana*	10	N	FACW
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	60		

Sapling/Shrub Stratum (Plot size: 15 ft radius)

1.	*Fraxinus pennsylvanica*	15	Y	FACW
2.	*Ulmus rubra*	15	Y	FAC
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	30		

Herb Stratum (Plot size: 5 ft radius)

1.	*Carex lurida*	20	Y	OBL
2.	*Toxicodendron radicans*	10	Y	FAC
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	30		

Woody Vine Stratum (Plot size: 30 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Remarks:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	20	x 1 =	20
FACW spp.	75	x 2 =	150
FAC spp.	25	x 3 =	75
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	120 (A)		245 (B)

Prevalence Index = B/A = ***2.042***

Hydrophytic Vegetation Indicators:

☐ Yes	☑ No	Rapid Test for Hydrophytic Vegetation
☑ Yes	☐ No	Dominance Test is > 50%
☑ Yes	☐ No	Prevalence Index is ≤ 3.0 *
☐ Yes	☑ No	Morphological Adaptations (Explain) *
☐ Yes	☑ No	Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Additional Remarks:

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site:	Utica Marcellus Texas Pipeline Project		Stantec Project #:	172673073	
Applicant:	Kinder Morgan				
Investigator #1:	AF	Investigator #2:	JM		
Soil Unit:	Brassfield silt loam, 12 to 30 percent slopes		NWI Classification:	N/A	
Landform:	Toeslope	Local Relief:	Convex		
Slope (%):	6	Latitude: 37.811806	Longitude:	-84.239996	Datum: NAD83

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☐ , Soil ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

Date:	08/12/14
County:	Madison
State:	KY
Wetland ID:	KY-CS875_WL01
Sample Point:	U1
Subregion:	LRR N
Community:	Upland

Section, Township, Range: N/A

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☐ Yes ☑ No	Hydric Soils Present?	☐ Yes ☑ No
Wetland Hydrology Present?	☐ Yes ☑ No	Is This Sampling Point Within A Wetland?	☐ **Yes** ☑ **No**

Remarks: A WETS analysis indicates the hydrologic conditions of the site preceding the investigation were within normal range.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B14 - True Aquatic Plants
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth:	N/A	(in.)
Water Table Present?	☐ Yes ☑ No	Depth:	>20	(in.)
Saturation Present?	☐ Yes ☑ No	Depth:	>20	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks:

SOILS

Map Unit Name: Brassfield silt loam, 12 to 30 percent slopes

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Redox Features Color (Moist)		Redox Features %	Redox Features Type	Redox Features Location	Texture (e.g. clay, sand, loam)
0	3	1	10YR	4/2	100	--	--	--	--	--	clay loam
3	12	2	10YR	4/4	95	10YR	4/6	5	C	M	clay loam
12	20	3	10YR	5/3	70	10YR	5/4	30	C	M	clay loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A10 - 2 cm Muck (LRR N)
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral (LRR N, MLRA 147, 148)
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface
- ☐ S8 - Polyvalue Below Dark Surface (MLRA 147, 148)
- ☐ S9 - Thin Dark Surface (MLRA 147, 148)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matirx
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions
- ☐ F12 - Iron-Manganese Masses (LRR N, MLRA 136)
- ☐ F13 - Umbric Surface (MLRA 122, 136)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 148)
- ☐ F21 - Red Parent Material (MLRA 127, 147)

Indicators for Problematic Soils [1]
- ☐ A10 - 2cm Muck (MLRA 147)
- ☐ A16 - Coast Prairie Redox (MLRA 147, 148)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 136, 147)
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site: Utica Marcellus Texas Pipeline Project Wetland ID: KY-CS875_WL01 Sample Point **U1**

VEGETATION

Tree Stratum (Plot size: 30 ft radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 15 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 5 ft radius)

1.	*Schedonorus arundinaceus*	40	Y	FACU
2.	*Setaria pumila*	10	N	FAC
3.	*Daucus carota*	20	Y	UPL
4.	*Vernonia noveboracensis*	5	N	FACW
5.	*Toxicodendron radicans*	10	N	FAC
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	85		

Woody Vine Stratum (Plot size: 30 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Remarks:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***0.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	5	x 2 =	10
FAC spp.	20	x 3 =	60
FACU spp.	40	x 4 =	160
UPL spp.	20	x 5 =	100
Total	85 (A)		330 (B)

Prevalence Index = B/A = ***3.882***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Additional Remarks:

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site:	Utica Marcellus Texas Pipeline Project		Stantec Project #:	172673073	
Applicant:	Kinder Morgan				
Investigator #1:	AF	Investigator #2:	JM		
Soil Unit:	Boonesboro silt loam		NWI Classification:	N/A	
Landform:	Floodplain	Local Relief:	Concave		
Slope (%):	1	Latitude: 37.809231	Longitude:	-84.241696	Datum: NAD83

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☐ , Soil ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

Date:	08/13/14
County:	Madison
State:	KY
Wetland ID:	KY-CS875_WL02
Sample Point:	W1
Subregion:	LRR N
Community:	PEM
Section, Township, Range:	N/A

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☑ Yes ☐ No	Hydric Soils Present?	☑ Yes ☐ No
Wetland Hydrology Present?	☑ Yes ☐ No	Is This Sampling Point Within A Wetland?	☑ **Yes** ☐ **No**

Remarks: A WETS analysis indicates the hydrologic conditions preceding the investigation were within normal range.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☑ A1 - Surface Water
- ☑ A2 - High Water Table
- ☑ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B14 - True Aquatic Plants
- ☐ C1 - Hydrogen Sulfide Odor
- ☑ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☑ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth:	0.5	(in.)
Water Table Present?	☑ Yes ☐ No	Depth:	0	(in.)
Saturation Present?	☑ Yes ☐ No	Depth:	0	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks:

SOILS

Map Unit Name: Boonesboro silt loam

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Redox Features Color (Moist)		Redox Features %	Redox Features Type	Redox Features Location	Texture (e.g. clay, sand, loam)
0	2	1	10YR	3/2	90	7.5YR	4/6	10	C	M	clay loam
2	12	2	10YR	4/2	80	7.5YR	4/6	15	C	M	clay loam
--	--	--				7.5YR	4/6	5	C	PL	--
12	20	3	10YR	4/3	95	10YR	4/6	5	C	M	clay loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A10 - 2 cm Muck (LRR N)
- ☑ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral (LRR N, MLRA 147, 148)
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface
- ☐ S8 - Polyvalue Below Dark Surface (MLRA 147, 148)
- ☐ S9 - Thin Dark Surface (MLRA 147, 148)
- ☐ F2 - Loamy Gleyed Matrix
- ☑ F3 - Depleted Matirx
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions
- ☐ F12 - Iron-Manganese Masses (LRR N, MLRA 136)
- ☐ F13 - Umbric Surface (MLRA 122, 136)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 148)
- ☐ F21 - Red Parent Material (MLRA 127, 147)

Indicators for Problematic Soils [1]
- ☐ A10 - 2cm Muck (MLRA 147)
- ☐ A16 - Coast Prairie Redox (MLRA 147, 148)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 136, 147)
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site: Utica Marcellus Texas Pipeline Project Wetland ID: KY-CS875_WL02 Sample Point **W1**

VEGETATION

Tree Stratum (Plot size: 30 ft radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 15 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 5 ft radius)

1.	*Cyperus strigosus*	50	Y	FACW
2.	*Vernonia noveboracensis*	20	Y	FACW
3.	*Carex frankii*	10	N	OBL
4.	--	--	--	--
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	80		

Woody Vine Stratum (Plot size: 30 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Remarks:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	10	x 1 =	10
FACW spp.	70	x 2 =	140
FAC spp.	0	x 3 =	0
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	80 (A)		150 (B)

Prevalence Index = B/A = ***1.875***

Hydrophytic Vegetation Indicators:

☑ Yes	☐ No	Rapid Test for Hydrophytic Vegetation
☑ Yes	☐ No	Dominance Test is > 50%
☑ Yes	☐ No	Prevalence Index is ≤ 3.0 *
☐ Yes	☑ No	Morphological Adaptations (Explain) *
☐ Yes	☑ No	Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Additional Remarks:

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site:	Utica Marcellus Texas Pipeline Project		Stantec Project #:	172673073	
Applicant:	Kinder Morgan				
Investigator #1:	AF	Investigator #2:	JM		
Soil Unit:	Boonesboro silt loam		NWI Classification:	N/A	
Landform:	Floodplain	Local Relief:	Convex		
Slope (%):	2	Latitude: 37.809326	Longitude:	-84.241504	Datum: NAD83

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☐ , Soil ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

Date:	08/13/14
County:	Madison
State:	KY
Wetland ID:	KY-CS875_WL02
Sample Point:	U1
Subregion:	LRR N
Community:	Upland

Section, Township, Range: N/A

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☐ Yes ☑ No	Hydric Soils Present?	☐ Yes ☑ No
Wetland Hydrology Present?	☐ Yes ☑ No	Is This Sampling Point Within A Wetland?	☐ **Yes** ☑ **No**

Remarks: A WETS analysis indicates the hydrologic conditions preceding the investigation were within normal range.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B14 - True Aquatic Plants
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth:	0	(in.)
Water Table Present?	☐ Yes ☑ No	Depth:	>20	(in.)
Saturation Present?	☐ Yes ☑ No	Depth:	>20	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks:

SOILS

Map Unit Name: Boonesboro silt loam

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Redox Features Color (Moist)		Redox Features %	Redox Features Type	Redox Features Location	Texture (e.g. clay, sand, loam)
0	2	1	10YR	3/3	100	--	--	--	--	--	clay loam
2	20	2	2.5YR	4/4	100	--	--	--	--	--	clay loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A10 - 2 cm Muck (LRR N)
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral (LRR N, MLRA 147, 148)
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface
- ☐ S8 - Polyvalue Below Dark Surface (MLRA 147, 148)
- ☐ S9 - Thin Dark Surface (MLRA 147, 148)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matirx
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions
- ☐ F12 - Iron-Manganese Masses (LRR N, MLRA 136)
- ☐ F13 - Umbric Surface (MLRA 122, 136)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 148)
- ☐ F21 - Red Parent Material (MLRA 127, 147)

Indicators for Problematic Soils [1]
- ☐ A10 - 2cm Muck (MLRA 147)
- ☐ A16 - Coast Prairie Redox (MLRA 147, 148)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 136, 147)
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site: Utica Marcellus Texas Pipeline Project Wetland ID: KY-CS875_WL02 Sample Point **U1**

VEGETATION

Tree Stratum (Plot size: 30 ft radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 15 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 5 ft radius)

1.	*Sorghum halepense*	20	Y	FACU
2.	*Daucus carota*	20	Y	UPL
3.	*Solanum carolinense*	10	N	FACU
4.	*Setaria pumila*	20	Y	FAC
5.	*Festuca rubra*	15	N	FACU
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	85		

Woody Vine Stratum (Plot size: 30 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Remarks:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***33.3%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	0	x 2 =	0
FAC spp.	20	x 3 =	60
FACU spp.	45	x 4 =	180
UPL spp.	20	x 5 =	100
Total	85 (A)		340 (B)

Prevalence Index = B/A = ***4.000***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Additional Remarks:

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site:	Utica Marcellus Texas Pipeline Project		Stantec Project #:	172673073	
Applicant:	Kinder Morgan				
Investigator #1:	J. Mann	Investigator #2:	AF		
Soil Unit:	Elk Silt Loam - 6-12% slopes		NWI Classification:	N/A	
Landform:	Toeslope	Local Relief:	Concave		
Slope (%):	1	Latitude: 37.8094137046177	Longitude:	-84.2579121678794	Datum: NAD83

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☐ , Soil ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

Date:	08/13/14
County:	Madison
State:	KY
Wetland ID:	KY-CS875_WL03
Sample Point:	W1
Subregion:	LRR N
Community:	PEM
Section, Township, Range:	N/A

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☑ Yes ☐ No	Hydric Soils Present?	☑ Yes ☐ No
Wetland Hydrology Present?	☑ Yes ☐ No	Is This Sampling Point Within A Wetland?	☑ **Yes** ☐ **No**

Remarks: N/A

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☑ A1 - Surface Water
- ☑ A2 - High Water Table
- ☑ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B14 - True Aquatic Plants
- ☐ C1 - Hydrogen Sulfide Odor
- ☑ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☑ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth:	0.5	(in.)
Water Table Present?	☑ Yes ☐ No	Depth:	0	(in.)
Saturation Present?	☑ Yes ☐ No	Depth:	0	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks: N/A

SOILS

Map Unit Name: Elk Silt Loam - 6-12% slopes

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Redox Features Color (Moist)		Redox Features %	Redox Features Type	Redox Features Location	Texture (e.g. clay, sand, loam)
0	3	1	10YR	4/2	100	--	--	--	--	--	loamy clay
3	20	2	10YR	5/1	88	7.5YR	4/6	10	C	M	loamy clay
--	--	--	--	--	--	7.5YR	4/6	2	C	PL	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A10 - 2 cm Muck (LRR N)
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral (LRR N, MLRA 147, 148)
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface
- ☐ S8 - Polyvalue Below Dark Surface (MLRA 147, 148)
- ☐ S9 - Thin Dark Surface (MLRA 147, 148)
- ☐ F2 - Loamy Gleyed Matrix
- ☑ F3 - Depleted Matirx
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions
- ☐ F12 - Iron-Manganese Masses (LRR N, MLRA 136)
- ☐ F13 - Umbric Surface (MLRA 122, 136)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 148)
- ☐ F21 - Red Parent Material (MLRA 127, 147)

Indicators for Problematic Soils [1]
- ☐ A10 - 2cm Muck (MLRA 147)
- ☐ A16 - Coast Prairie Redox (MLRA 147, 148)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 136, 147)
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☑ Yes ☐ No

Remarks: N/A

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site: Utica Marcellus Texas Pipeline Project Wetland ID: KY-CS875_WL03 Sample Point **W1**

VEGETATION

Tree Stratum (Plot size: 30 ft radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 15 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 5 ft radius)

1.	*Scirpus atrovirens*	40	Y	OBL
2.	*Leersia oryzoides*	15	N	OBL
3.	*Juncus acuminatus*	15	N	OBL
4.	*Carex frankii*	20	Y	OBL
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	90		

Woody Vine Stratum (Plot size: 30 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Remarks: N/A

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	90	x 1 =	90
FACW spp.	0	x 2 =	0
FAC spp.	0	x 3 =	0
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	90 (A)		90 (B)

Prevalence Index = B/A = ***1.000***

Hydrophytic Vegetation Indicators:

☑ Yes	☐ No	Rapid Test for Hydrophytic Vegetation
☑ Yes	☐ No	Dominance Test is > 50%
☑ Yes	☐ No	Prevalence Index is ≤ 3.0 *
☐ Yes	☑ No	Morphological Adaptations (Explain) *
☐ Yes	☑ No	Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Additional Remarks:

N/A

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site:	Utica Marcellus Texas Pipeline Project		Stantec Project #:	172673073	
Applicant:	Kinder Morgan				
Investigator #1:	JM	Investigator #2:	AF		
Soil Unit:	Elk Silt Loam - 6-12% slopes		NWI Classification:	[E.g. E3/2K]	
Landform:	Shoulder	Local Relief:	Convex		
Slope (%):	15	Latitude: 37.8092776410036	Longitude:	-84.2580968533543	Datum: NAD83

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☐ , Soil ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

Date:	08/13/14
County:	KY
State:	Madison
Wetland ID:	KY-CS875_WL03
Sample Point:	U1
Subregion:	LRR N
Community:	Upland

Section, Township, Range: N/A

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☑ Yes ☐ No	Hydric Soils Present?	☐ Yes ☑ No
Wetland Hydrology Present?	☐ Yes ☑ No	Is This Sampling Point Within A Wetland?	☐ Yes ☑ No

Remarks: The vegetation is dominated by FAC species and passes the dominance test, but evidence of hydrology and hydric characteristics in the soil are not present. Therefore, the site is determined to be upland.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B14 - True Aquatic Plants
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth: N/A	(in.)
Water Table Present?	☐ Yes	☑ No	Depth: N/A	(in.)
Saturation Present?	☐ Yes	☑ No	Depth: N/A	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks: N/A

SOILS

Map Unit Name: Elk Silt Loam - 6-12% slopes

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Redox Features Color (Moist)		Redox Features %	Redox Features Type	Redox Features Location	Texture (e.g. clay, sand, loam)
0	2	1	2.5Y	3/3	100	--	--	--	--	--	clay loam
2	20	2	2.5Y	4/3	100	--	--	--	--	--	clay loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A10 - 2 cm Muck (LRR N)
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral (LRR N, MLRA 147, 148)
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface
- ☐ S8 - Polyvalue Below Dark Surface (MLRA 147, 148)
- ☐ S9 - Thin Dark Surface (MLRA 147, 148)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matirx
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions
- ☐ F12 - Iron-Manganese Masses (LRR N, MLRA 136)
- ☐ F13 - Umbric Surface (MLRA 122, 136)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 148)
- ☐ F21 - Red Parent Material (MLRA 127, 147)

Indicators for Problematic Soils [1]
- ☐ A10 - 2cm Muck (MLRA 147)
- ☐ A16 - Coast Prairie Redox (MLRA 147, 148)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 136, 147)
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☐ Yes ☑ No

Remarks: N/A

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site: Utica Marcellus Texas Pipeline Project Wetland ID: KY-CS875_WL03 Sample Point **U1**

VEGETATION

Tree Stratum (Plot size: 30 ft radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 15 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 5 ft radius)

1.	*Schedonorus arundinaceus*	60	Y	FAC
2.	*Daucus carota*	15	N	UPL
3.	*Vernonia noveboracensis*	15	N	FACW
4.	--	--	--	--
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	90		

Woody Vine Stratum (Plot size: 30 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Remarks: N/A

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	15	x 2 =	30
FAC spp.	60	x 3 =	180
FACU spp.	0	x 4 =	0
UPL spp.	15	x 5 =	75
Total	90 (A)		285 (B)

Prevalence Index = B/A = ***3.167***

Hydrophytic Vegetation Indicators:

☐ Yes	☑ No	Rapid Test for Hydrophytic Vegetation
☑ Yes	☐ No	Dominance Test is > 50%
☐ Yes	☑ No	Prevalence Index is ≤ 3.0 *
☐ Yes	☑ No	Morphological Adaptations (Explain) *
☐ Yes	☑ No	Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Additional Remarks:

N/A

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site:	Utica Marcellus Texas Pipeline Project		Stantec Project #:	172673073	
Applicant:	Kinder Morgan				
Investigator #1:	AF	Investigator #2:	JM		
Soil Unit:	Brassfield silt loam, 12 to 30 percent slopes		NWI Classification:	N/A	
Landform:	Depression	Local Relief:	Concave		
Slope (%):	1	Latitude: 37.808873	Longitude:	-84.257077	Datum: NAD83

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☐ , Soil ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

Date:	08/13/14
County:	Madison
State:	KY
Wetland ID:	KY-CS875_WL04
Sample Point:	W1
Subregion:	LRR N
Community:	PEM
Section, Township, Range:	N/A

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Is This Sampling Point Within A Wetland? ☑ **Yes** ☐ **No**

Remarks: A WETS analysis indicates the hydrologic conditions of the site preceding the investigation were within normal range. Sample point is located in bottom of a drainageway.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☑ A1 - Surface Water
- ☑ A2 - High Water Table
- ☑ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B14 - True Aquatic Plants
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☑ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth:	1	(in.)
Water Table Present?	☑ Yes ☐ No	Depth:	0	(in.)
Saturation Present?	☑ Yes ☐ No	Depth:	0	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks:

SOILS

Map Unit Name: Brassfield silt loam, 12 to 30 percent slopes

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Redox Features Color (Moist)		Redox Features %	Redox Features Type	Redox Features Location	Texture (e.g. clay, sand, loam)
0	2	1	10YR	4/2	100	--	--	--	--	--	clay loam
2	20	2	10YR	5/1	88	7.5YR	4/6	10	C	M	clay loam
--	--	--	--	--	--	7.5YR	4/6	2	C	PL	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A10 - 2 cm Muck (LRR N)
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral (LRR N, MLRA 147, 148)
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface
- ☐ S8 - Polyvalue Below Dark Surface (MLRA 147, 148)
- ☐ S9 - Thin Dark Surface (MLRA 147, 148)
- ☐ F2 - Loamy Gleyed Matrix
- ☑ F3 - Depleted Matirx
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions
- ☐ F12 - Iron-Manganese Masses (LRR N, MLRA 136)
- ☐ F13 - Umbric Surface (MLRA 122, 136)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 148)
- ☐ F21 - Red Parent Material (MLRA 127, 147)

Indicators for Problematic Soils [1]
- ☐ A10 - 2cm Muck (MLRA 147)
- ☐ A16 - Coast Prairie Redox (MLRA 147, 148)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 136, 147)
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site: Utica Marcellus Texas Pipeline Project Wetland ID: KY-CS875_WL04 Sample Point **W1**

VEGETATION

Tree Stratum (Plot size: 30 ft radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 15 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 5 ft radius)

1.	*Scirpus atrovirens*	75	Y	OBL
2.	*Leersia oryzoides*	15	N	OBL
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	90		

Woody Vine Stratum (Plot size: 30 ft radius)

1.			--	#N/A
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	90	x 1 =	90
FACW spp.	0	x 2 =	0
FAC spp.	0	x 3 =	0
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	90 (A)		90 (B)

Prevalence Index = B/A = ***1.000***

Hydrophytic Vegetation Indicators:

- ☑ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks:

Additional Remarks:

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site:	Utica Marcellus Texas Pipeline Project		Stantec Project #:	172673073	
Applicant:	Kinder Morgan				
Investigator #1:	AF	Investigator #2:	JM		
Soil Unit:	Brassfield silt loam, 12 to 30 percent slopes		NWI Classification:	N/A	
Landform:	Toeslope	Local Relief:	Convex		
Slope (%):	10	Latitude: 37.808880	Longitude:	-84.257070	Datum: NAD83

Date:	08/13/14		
County:	Madison		
State:	KY		
Wetland ID:	KY-CS875_WL04		
Sample Point:	U1		
Subregion:	LRR N		
Community:	Upland		
Section, Township, Range:	N/A		

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☐ , Soil ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☐ Yes ☑ No	Hydric Soils Present?	☐ Yes ☑ No
Wetland Hydrology Present?	☐ Yes ☑ No	Is This Sampling Point Within A Wetland?	☐ **Yes** ☑ **No**

Remarks: A WETS analysis indicates the hydrologic condtions of the site preceding the investigation were within normal range. While the soil does have some hydric characteristics (see soils remarks), the vegetation and hydrology support an upland determination.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B14 - True Aquatic Plants
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth:	NA	(in.)
Water Table Present?	☐ Yes ☑ No	Depth:	>20	(in.)
Saturation Present?	☐ Yes ☑ No	Depth:	>20	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks:

SOILS

Map Unit Name: Brassfield silt loam, 12 to 30 percent slopes

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Redox Features Color (Moist)		Redox Features %	Redox Features Type	Redox Features Location	Texture (e.g. clay, sand, loam)
0	3	1	10YR	4/2	100	--	--	--	--	--	clay loam
3	20	2	2.5Y	4/3	90	2.5Y	5/6	10	C	M	clay loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A10 - 2 cm Muck (LRR N)
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral (LRR N, MLRA 147, 148)
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface
- ☐ S8 - Polyvalue Below Dark Surface (MLRA 147, 148)
- ☐ S9 - Thin Dark Surface (MLRA 147, 148)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matirx
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions
- ☐ F12 - Iron-Manganese Masses (LRR N, MLRA 136)
- ☐ F13 - Umbric Surface (MLRA 122, 136)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 148)
- ☐ F21 - Red Parent Material (MLRA 127, 147)

Indicators for Problematic Soils [1]
- ☐ A10 - 2cm Muck (MLRA 147)
- ☐ A16 - Coast Prairie Redox (MLRA 147, 148)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 136, 147)
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☐ Yes ☑ No

Remarks: The soil would meet indicators F3 and A11, but the chroma in Horizon 2 is too high by one.

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site: Utica Marcellus Texas Pipeline Project Wetland ID: KY-CS875_WL04 Sample Point **U1**

VEGETATION

Tree Stratum (Plot size: 30 ft radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 15 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 5 ft radius)

1.	*Schedonorus arundinaceus*	40	Y	FACU
2.	*Setaria pumila*	20	Y	FAC
3.	*Daucus carota*	15	N	UPL
4.	*Coleataenia anceps*	15	N	FAC
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	90		

Woody Vine Stratum (Plot size: 30 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Remarks:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***50.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	0	x 2 =	0
FAC spp.	35	x 3 =	105
FACU spp.	40	x 4 =	160
UPL spp.	15	x 5 =	75
Total	90 (A)		340 (B)

Prevalence Index = B/A = ***3.778***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Additional Remarks:

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site:	Utica Marcellus Texas Pipeline Project		Stantec Project #:	172673073	
Applicant:	Kinder Morgan				
Investigator #1:	AF	Investigator #2:	JM		
Soil Unit:	Brassfield silt loam, 12 to 30 percent slopes		NWI Classification:	N/A	
Landform:	Toeslope	Local Relief:	Concave		
Slope (%):	2	Latitude:	37.808804	Longitude:	-84.252948

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☐ , Soil ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

Date:	08/14/14
County:	Madison
State:	KY
Wetland ID:	KY-CS875_WL05
Sample Point:	W1
Subregion:	LRR N
Community:	PEM

Section, Township, Range: N/A

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☑ Yes ☐ No	Hydric Soils Present?	☑ Yes ☐ No
Wetland Hydrology Present?	☑ Yes ☐ No	Is This Sampling Point Within A Wetland?	☑ **Yes** ☐ **No**

Remarks: A WETS analysis indicates the hydrologic conditions preceding the investigation were within normal range.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☑ A1 - Surface Water
- ☑ A2 - High Water Table
- ☑ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B14 - True Aquatic Plants
- ☐ C1 - Hydrogen Sulfide Odor
- ☑ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☑ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth:	0.5	(in.)
Water Table Present?	☑ Yes ☐ No	Depth:	0	(in.)
Saturation Present?	☑ Yes ☐ No	Depth:	0	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks:

SOILS

Map Unit Name: Brassfield silt loam, 12 to 30 percent slopes

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Redox Features Color (Moist)		Redox Features %	Redox Features Type	Redox Features Location	Texture (e.g. clay, sand, loam)
0	3	1	10YR	4/2	100	--	--	--	--	--	clay loam
3	20	2	2.5YR	4/2	88	7.5YR	4/6	10	C	M	clay loam
--	--	--	--	--	--	7.5YR	4/6	2	C	PL	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A10 - 2 cm Muck (LRR N)
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral (LRR N, MLRA 147, 148)
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface
- ☐ S8 - Polyvalue Below Dark Surface (MLRA 147, 148)
- ☐ S9 - Thin Dark Surface (MLRA 147, 148)
- ☐ F2 - Loamy Gleyed Matrix
- ☑ F3 - Depleted Matirx
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions
- ☐ F12 - Iron-Manganese Masses (LRR N, MLRA 136)
- ☐ F13 - Umbric Surface (MLRA 122, 136)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 148)
- ☐ F21 - Red Parent Material (MLRA 127, 147)

Indicators for Problematic Soils [1]
- ☐ A10 - 2cm Muck (MLRA 147)
- ☐ A16 - Coast Prairie Redox (MLRA 147, 148)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 136, 147)
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site: Utica Marcellus Texas Pipeline Project Wetland ID: KY-CS875_WL05 Sample Point **W1**

VEGETATION

Tree Stratum (Plot size: 30 ft radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	*Platanus occidentalis*	5	Y	FACW
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	5		

Sapling/Shrub Stratum (Plot size: 15 ft radius)

1.	*Fraxinus pennsylvanica*	5	Y	FACW
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	5		

Herb Stratum (Plot size: 5 ft radius)

1.	*Carex frankii*	25	Y	OBL
2.	*Scirpus atrovirens*	40	Y	OBL
3.	*Leersia oryzoides*	10	N	OBL
4.	*Juncus effusus*	20	Y	FACW
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	95		

Woody Vine Stratum (Plot size: 30 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Remarks:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	75	x 1 =	75
FACW spp.	30	x 2 =	60
FAC spp.	0	x 3 =	0
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	105 (A)		135 (B)

Prevalence Index = B/A = ***1.286***

Hydrophytic Vegetation Indicators:

- ☑ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Additional Remarks:

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site:	Utica Marcellus Texas Pipeline Project		Stantec Project #:	172673073	
Applicant:	Kinder Morgan				
Investigator #1:	JM	Investigator #2:			
Soil Unit:	Brassfield silt loam, 12 to 30 percent slopes		NWI Classification:	N/A	
Landform:	Toeslope	Local Relief:	Convex		
Slope (%):	10	Latitude: 37.808797	Longitude:	-84.252857	Datum: NAD83

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☑ Yes ☐ No

Are Vegetation ☐ , Soil ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

Date:	08/14/14
County:	Madison
State:	KY
Wetland ID:	KY-CS875_WL05
Sample Point:	U1
Subregion:	LRR N
Community:	Upland

Section, Township, Range: N/A

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☐ Yes ☑ No	Hydric Soils Present?	☐ Yes ☑ No
Wetland Hydrology Present?	☐ Yes ☑ No	Is This Sampling Point Within A Wetland?	☐ **Yes** ☑ **No**

Remarks: A WETS analysis indicates the hydrologic conditions of the site precedin the investigation were within normal range.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑)**:**

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B14 - True Aquatic Plants
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth:	0	(in.)
Water Table Present?	☐ Yes ☑ No	Depth:	>20	(in.)
Saturation Present?	☐ Yes ☑ No	Depth:	>20	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks:

SOILS

Map Unit Name: Brassfield silt loam, 12 to 30 percent slopes

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Redox Features Color (Moist)		Redox Features %	Redox Features Type	Redox Features Location	Texture (e.g. clay, sand, loam)
0	4	1	10YR	3/2	100	--	--	--	--	--	clay loam
4	20	2	2.5Y	4/3	95	2.5Y	5/4	5	C	M	clay loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑)**:**

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A10 - 2 cm Muck (LRR N)
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral (LRR N, MLRA 147, 148)
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface
- ☐ S8 - Polyvalue Below Dark Surface (MLRA 147, 148)
- ☐ S9 - Thin Dark Surface (MLRA 147, 148)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matirx
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions
- ☐ F12 - Iron-Manganese Masses (LRR N, MLRA 136)
- ☐ F13 - Umbric Surface (MLRA 122, 136)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 148)
- ☐ F21 - Red Parent Material (MLRA 127, 147)

Indicators for Problematic Soils [1]
- ☐ A10 - 2cm Muck (MLRA 147)
- ☐ A16 - Coast Prairie Redox (MLRA 147, 148)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 136, 147)
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site: Utica Marcellus Texas Pipeline Project Wetland ID: KY-CS875_WL05 Sample Point **U1**

VEGETATION

Tree Stratum (Plot size: 30 ft radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 15 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 5 ft radius)

1.	*Schedonorus arundinaceus*	65	Y	FACU
2.	*Setaria pumila*	15	N	FAC
3.	*Daucus carota*	15	N	UPL
4.	--	--	--	--
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	95		

Woody Vine Stratum (Plot size: 30 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Remarks:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***0.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	0	x 2 =	0
FAC spp.	15	x 3 =	45
FACU spp.	65	x 4 =	260
UPL spp.	15	x 5 =	75
Total	95 (A)		380 (B)

Prevalence Index = B/A = ***4.000***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Additional Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: TGPCON City/County: Marion Sampling Date: 11/07/2013

Applicant/Owner: KINDER MORGAN State: KY Sampling Point: KY0310E_WL1_W 1

Investigator(s): SDG Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Depression (ditch) Local relief (concave, convex, none): CL

Slope (%): 3 - 7% Lat: 37.397075 Long: -85.291627 Datum: NAD 83

Soil Map Unit Name: Lawrence silt loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ____	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Sample point located in roadside ditch - no soil sample collected; soils assumed hydric. Based on a WETS analysis, conditions were wetter than normal.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: KY0310E_WL1_W1

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover: 0			
50% of total cover: 0	20% of total cover: 0		
Sapling Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover: 0			
50% of total cover: 0	20% of total cover: 0		
Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover: 0			
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 5)			
1. Scirpus atrovirens	80	Yes	OBL
2. Poa pratensis	10	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
Total Cover: 90			
50% of total cover: 45	20% of total cover: 18		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
Total Cover: 0			
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	80	x 1 =	80
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	10	x 5 =	50
Column Totals:	90 (A)		130 (B)

Prevalence Index = B/A = 1.44

Hydrophytic Vegetation Indicators:

- ___ 1- Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: KY0310E_WL1_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coastal Prairie Redox (A16) (MLRA 147, 148)
- ___ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): 0.00

Hydric Soil Present? **Yes** _____ **No** ___

Remarks: Sample point located along roadside ditch - soil sample not collected; soils assumed hydric.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: TGPCON City/County: Marion Sampling Date: 11/07/2013

Applicant/Owner: KINDER MORGAN State: KY Sampling Point: KY0310E_WL1_U1

Investigator(s): SDG Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Sideslope Local relief (concave, convex, none): VV

Slope (%): 3 - 7% Lat: 37.496753 Long: -85.291933 Datum: NAD 83

Soil Map Unit Name: Lawrence silt loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No _____	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sample point located along roadside ditch - no soil sample collected, soils assumed non-hydric. Based on a WETS analysis, conditions were wetter than normal.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: KY0310E_WL1_U1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover: 0			
50% of total cover: 0	20% of total cover: 0		
Sapling Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover: 0			
50% of total cover: 0	20% of total cover: 0		
Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover: 0			
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 5)			
1. Dactylis glomerata	70	Yes	FACU
2. Poa pratensis	15	No	FACU
3. Daucus carota	10	No	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
Total Cover: 95			
50% of total cover: 47.5	20% of total cover: 19		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
Total Cover: 0			
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	80	x 4 =	320
UPL species	10	x 5 =	50
Column Totals:	95 (A)		370 (B)

Prevalence Index = B/A = 3.89

Hydrophytic Vegetation Indicators:

___ 1- Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: KY0310E_WL1_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coastal Prairie Redox (A16) (MLRA 147, 148)
- ___ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): 0.00

Hydric Soil Present? Yes _____ No ___

Remarks: Sample point located along roadside ditch - soil sample not collected; soils assumed non-hydric.

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site:	Utica Marcellus Texas Pipeline Project	Stantec Project #:	172673073
Applicant:	Kinder Morgan		
Investigator #1:	PF	Investigator #2:	
Soil Unit:	Trappist-Jessietown complex	NWI Classification:	N/A
Landform:	Hillslope	Local Relief:	Concave
Slope (%):	30	Latitude: 37.489640	Longitude: -85.306393 Datum: NAD83

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☐ No

Are Vegetation ☐ , Soil ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

Date:	10/31/14
County:	Marion
State:	Kentucky
Wetland ID:	KY-MA-PS07_WL01
Sample Point:	**W1**
Subregion:	LRR N
Community:	PEM

Section, Township, Range: N/A

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	☑ Yes ☐ No	Hydric Soils Present?	☑ Yes ☐ No
Wetland Hydrology Present?	☑ Yes ☐ No	Is This Sampling Point Within A Wetland?	☑ **Yes** ☐ **No**

Remarks: A WETS analysis indicates the hydrologic conditions of the site prior to investigation were drier than normal.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B14 - True Aquatic Plants
- ☐ C1 - Hydrogen Sulfide Odor
- ☑ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☑ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☑ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth:	(in.)
Water Table Present?	☐ Yes	☑ No	Depth:	(in.)
Saturation Present?	☑ Yes	☐ No	Depth: 0	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks:

SOILS

Map Unit Name: Trappist-Jessietown complex

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Redox Features Color (Moist)		Redox Features %	Redox Features Type	Redox Features Location	Texture (e.g. clay, sand, loam)
0	4	1	10YR	4/2	98	7.5YR	5/4	2	C	PL	clay
4	20	2	10YR	4/2	95	7.5YR	6/6	5	C	M	clay
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A10 - 2 cm Muck (LRR N)
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral (LRR N, MLRA 147, 148)
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface
- ☐ S8 - Polyvalue Below Dark Surface (MLRA 147, 148)
- ☐ S9 - Thin Dark Surface (MLRA 147, 148)
- ☐ F2 - Loamy Gleyed Matrix
- ☑ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions
- ☐ F12 - Iron-Manganese Masses (LRR N, MLRA 136)
- ☐ F13 - Umbric Surface (MLRA 122, 136)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 148)
- ☐ F21 - Red Parent Material (MLRA 127, 147)

Indicators for Problematic Soils [1]
- ☐ A10 - 2cm Muck (MLRA 147)
- ☐ A16 - Coast Prairie Redox (MLRA 147, 148)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 136, 147)
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☑ Yes ☐ No

Remarks:

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site: Utica Marcellus Texas Pipeline Project Wetland ID: KY-MA-PS07_WL01 Sample Point **W1**

VEGETATION

Tree Stratum (Plot size: 30 ft radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 15 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 5 ft radius)

1.	*Juncus effusus*	70	Y	FACW
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	70		

Woody Vine Stratum (Plot size: 30 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	70	x 2 =	140
FAC spp.	0	x 3 =	0
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	70 (A)		140 (B)

Prevalence Index = B/A = ***2.000***

Hydrophytic Vegetation Indicators:

☑ Yes	☐ No	Rapid Test for Hydrophytic Vegetation
☑ Yes	☐ No	Dominance Test is > 50%
☑ Yes	☐ No	Prevalence Index is ≤ 3.0 *
☐ Yes	☑ No	Morphological Adaptations (Explain) *
☐ Yes	☑ No	Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks:

Additional Remarks:

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site:	Utica Marcellus Texas Pipeline Project	Stantec Project #:	172673073
Applicant:	Kinder Morgan		
Investigator #1:	PF	Investigator #2:	
Soil Unit:	Trappist-Jessietown complex	NWI Classification:	N/A
Landform:	hillslope	Local Relief:	Concave
Slope (%):	30	Latitude: 37.489554	Longitude: -85.306483 Datum: NAD83

Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) ☐ Yes ☑ No

Are Vegetation ☐, Soil ☐ or Hydrology ☐ significantly disturbed?
Are Vegetation ☐, Soil ☐ or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

Date:	10/31/14
County:	Marion
State:	KY
Wetland ID:	KY-MA-PS07_WL01
Sample Point:	**U1**
Subregion:	LRR N
Community:	Upland
Section, Township, Range:	N/A

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☐ **Yes** ☑ **No**

Remarks: A WETS analysis indicates the hydrologic conditions of the site prior to investigation werer drier than normal.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B14 - True Aquatic Plants
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary:
- ☐ B6 - Surface Soil Cracks
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B10 - Drainage Patterns
- ☐ B16 - Moss Trim Lines
- ☐ C2 - Dry Season Water Table
- ☐ C8 - Crayfish Burrows
- ☐ C9 - Saturation Visible on Aerial Imagery
- ☐ D1 - Stunted or Stressed Plants
- ☐ D2 - Geomorphic Position
- ☐ D3 - Shallow Aquitard
- ☐ D4 - Microtopographic Relief
- ☐ D5 - FAC-Neutral Test

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth:	N/A	(in.)
Water Table Present?	☐ Yes ☑ No	Depth:	N/A	(in.)
Saturation Present?	☐ Yes ☑ No	Depth:	N/A	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks:

SOILS

Map Unit Name: Trappist-Jessietown complex

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)		Matrix %	Redox Features Color (Moist)		Redox Features %	Redox Features Type	Redox Features Location	Texture (e.g. clay, sand, loam)
0	20	1	10YR	6/3	100	--	--	--	--	--	clay loam
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):

- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A10 - 2 cm Muck (LRR N)
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral (LRR N, MLRA 147, 148)
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface
- ☐ S8 - Polyvalue Below Dark Surface (MLRA 147, 148)
- ☐ S9 - Thin Dark Surface (MLRA 147, 148)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matirx
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions
- ☐ F12 - Iron-Manganese Masses (LRR N, MLRA 136)
- ☐ F13 - Umbric Surface (MLRA 122, 136)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 148)
- ☐ F21 - Red Parent Material (MLRA 127, 147)

Indicators for Problematic Soils [1]
- ☐ A10 - 2cm Muck (MLRA 147)
- ☐ A16 - Coast Prairie Redox (MLRA 147, 148)
- ☐ F19 - Piedmont Floodplain Soils (MLRA 136, 147)
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

[1] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☐ Yes ☑ No

Remarks:

WETLAND DETERMINATION DATA FORM
Eastern Mountains and Piedmont Region

Project/Site: Utica Marcellus Texas Pipeline Project Wetland ID: KY-MA-PS07_WL01 Sample Point U1

VEGETATION

Tree Stratum (Plot size: 30 ft radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 15 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 5 ft radius)

1.	*Poa pratensis*	85	Y	FACU
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	85		

Woody Vine Stratum (Plot size: 30 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
	Total Cover =	0		

Remarks:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ***0.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	0	x 2 =	0
FAC spp.	0	x 3 =	0
FACU spp.	85	x 4 =	340
UPL spp.	0	x 5 =	0
Total	85 (A)		340 (B)

Prevalence Index = B/A = ***4.000***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Additional Remarks:

Appendix C Stream Data Forms — RBP

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (FRONT)

STREAM NAME KY-RO-PS04_ST01	LOCATION Rowan County, KY	
STATION # NA RIVERMILE NA	STREAM CLASS Intermittent	
LAT 38.287810 LONG -83.404393	RIVER BASIN 05100101	
STORET # NA	AGENCY NA	
INVESTIGATORS PF / PP		
FORM COMPLETED BY PF	DATE 10/23/14 TIME 5:15 AM (PM)	REASON FOR SURVEY Pipeline construction

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% 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).	30-50% 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).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE 13	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE 15	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE 10	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 <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% 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 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 15	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 2	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 (2) 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
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 18	20 19 **(18)** 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE 5	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	**(5)** 4 3 2 1 0
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.
SCORE 6 (LB)	Left Bank 10 9	8 7 **(6)**	5 4 3	2 1 0
SCORE 6 (RB)	Right Bank 10 9	8 7 **(6)**	5 4 3	2 1 0
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream.	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 8 (LB)	Left Bank 10 9	**(8)** 7 6	5 4 3	2 1 0
SCORE 8 (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 9 (LB)	Left Bank 10 **(9)**	8 7 6	5 4 3	2 1 0
SCORE 8 (RB)	Right Bank 10 9	**(8)** 7 6	5 4 3	2 1 0

Total Score 123

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (FRONT)

STREAM NAME KY-RO-PS04_ST02	LOCATION Rowan County, KY	
STATION # NA RIVERMILE NA	STREAM CLASS Intermittent	
LAT 38.287736 LONG -83.404643	RIVER BASIN 05100101	
STORET # NA	AGENCY NA	
INVESTIGATORS PF / PP		
FORM COMPLETED BY PF	DATE 10/24/14 TIME 1:05 AM (PM)	REASON FOR SURVEY Pipeline construction

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% 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).	30-50% 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).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE 10	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE 10	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE 6	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 <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% 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 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 5	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 1	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 (1) 0

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
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 16	20 19 18 17 **16**	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE 5	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	**5** 4 3 2 1 0
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.
SCORE 5 (LB)	Left Bank 10 9	8 7 6	**5** 4 3	2 1 0
SCORE 5 (RB)	Right Bank 10 9	8 7 6	**5** 4 3	2 1 0
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream.	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 6 (LB)	Left Bank 10 9	8 7 **6**	5 4 3	2 1 0
SCORE 6 (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 10 (LB)	Left Bank **10** 9	8 7 6	5 4 3	2 1 0
SCORE 8 (RB)	Right Bank 10 9	**8** 7 6	5 4 3	2 1 0

Total Score 93

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (FRONT)

STREAM NAME KY-RO-PS04_ST03	LOCATION Rowan County, KY	
STATION # NA RIVERMILE NA	STREAM CLASS Intermittent	
LAT 38.287842 LONG -83.404684	RIVER BASIN 05100101	
STORET # NA	AGENCY NA	
INVESTIGATORS PF / PP		
FORM COMPLETED BY PF	DATE 10/24/14 TIME 1:20 AM (PM)	REASON FOR SURVEY Pipeline construction

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% 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).	30-50% 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).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE 12	20 19 18 17 16	15 14 13 (12) 11	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE 16	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE 10	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 <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% 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 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 16	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 2	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 (2) 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
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 16	20 19 18 17 **16**	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE 10	20 19 18 17 16	15 14 13 12 11	**10** 9 8 7 6	5 4 3 2 1 0
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.
SCORE 5 (LB)	Left Bank 10 9	8 7 6	**5** 4 3	2 1 0
SCORE 5 (RB)	Right Bank 10 9	8 7 6	**5** 4 3	2 1 0
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream.	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 8 (LB)	Left Bank 10 9	**8** 7 6	5 4 3	2 1 0
SCORE 8 (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 9 (LB)	Left Bank 10 **9**	8 7 6	5 4 3	2 1 0
SCORE 6 (RB)	Right Bank 10 9	8 7 **6**	5 4 3	2 1 0

Total Score 123

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME KY-CS875_ST01	LOCATION Madison County, KY	
STATION # NA RIVERMILE NA	STREAM CLASS Intermittent	
LAT 37.812749 LONG -84.243058	RIVER BASIN 05100205	
STORET # NA	AGENCY NA	
INVESTIGATORS AF / JM		
FORM COMPLETED BY AF / JM	DATE 8/11/14 TIME NR AM PM	REASON FOR SURVEY Pipeline construction

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	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 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 8	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 11	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). (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 10	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 16	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 10	20 19 18 17 16	15 14 13 12 11	**10** 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
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 13	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 (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 17	20 19 18 **17** 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
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 8 (LB)	Left Bank 10 9	**8** 7 6	5 4 3	2 1 0
SCORE 8 (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; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE 6 (LB)	Left Bank 10 9	8 7 **6**	5 4 3	2 1 0
SCORE 6 (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 8 (LB)	Left Bank 10 9	**8** 7 6	5 4 3	2 1 0
SCORE 8 (RB)	Right Bank 10 9	**8** 7 6	5 4 3	2 1 0

Total Score 129

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME KY-CS875_ST02	LOCATION Madison County, KY	
STATION # NA RIVERMILE NA	STREAM CLASS Intermittent	
LAT 37.811487 LONG -84.240678	RIVER BASIN 05100205	
STORET # NA	AGENCY NA	
INVESTIGATORS AF / JM		
FORM COMPLETED BY AF / JM	DATE 8/12/14 TIME NR AM PM	REASON FOR SURVEY Pipeline construction

	Habitat Parameter	Condition Category			
		Optimal	Suboptimal	Marginal	Poor
Parameters to be evaluated in sampling reach	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 6	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 12	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). (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 7	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 15	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 6	20 19 18 17 16	15 14 13 12 11	10 9 8 7 **6**	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
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 16	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 (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 12	20 19 18 17 16	15 14 13 **12** 11	10 9 8 7 6	5 4 3 2 1 0
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 8 (LB)	Left Bank 10 9	**8** 7 6	5 4 3	2 1 0
SCORE 8 (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; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE 5 (LB)	Left Bank 10 9	8 7 6	**5** 4 3	2 1 0
SCORE 5 (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 8 (LB)	Left Bank 10 9	**8** 7 6	5 4 3	2 1 0
SCORE 8 (RB)	Right Bank 10 9	**8** 7 6	5 4 3	2 1 0

Total Score 116

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME KY-CS875_ST03	LOCATION Madison County, KY	
STATION # NA RIVERMILE NA	STREAM CLASS Intermittent	
LAT 37.810460 LONG -84.240261	RIVER BASIN 05100205	
STORET # NA	AGENCY NA	
INVESTIGATORS AF / JM		
FORM COMPLETED BY AF / JM	DATE 8/12/14 TIME NR AM PM	REASON FOR SURVEY Pipeline construction

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category: 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 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 6	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 11	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). (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 9	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 15	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 7	20 19 18 17 16	15 14 13 12 11	10 9 8 **7** 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
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 16	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 (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 11	20 19 18 17 16	15 14 13 12 **11**	10 9 8 7 6	5 4 3 2 1 0
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 6 (LB)	Left Bank 10 9	8 7 **6**	5 4 3	2 1 0
SCORE 6 (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; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE 5 (LB)	Left Bank 10 9	8 7 6	**5** 4 3	2 1 0
SCORE 5 (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 9 (LB)	Left Bank 10 **9**	8 7 6	5 4 3	2 1 0
SCORE 9 (RB)	Right Bank 10 **9**	8 7 6	5 4 3	2 1 0

Total Score 115

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME KY-CS875_ST04	LOCATION Madison County, KY	
STATION # NA RIVERMILE NA	STREAM CLASS Intermittent	
LAT 37.809393 LONG -84.238658	RIVER BASIN 05100205	
STORET # NA	AGENCY NA	
INVESTIGATORS AF / JM		
FORM COMPLETED BY AF / JM	DATE 8/12/14 TIME NR AM PM	REASON FOR SURVEY Pipeline construction

	Habitat Parameter	Condition Category			
		Optimal	**Suboptimal**	**Marginal**	**Poor**
Parameters to be evaluated in sampling reach	**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 5	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 11	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). (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 8	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 11	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 6	20 19 18 17 16	15 14 13 12 11	10 9 8 7 **6**	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach	Habitat Parameter	Condition Category: Optimal					Suboptimal					Marginal					Poor					
	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 19	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 (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 12	20	19	18	17	16	15	14	13	(12)	11	10	9	8	7	6	5	4	3	2	1	0
	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 6 (LB)	Left Bank	10		9		8	7	(6)			5	4	3			2	1	0			
	SCORE 6 (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; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
	SCORE 5 (LB)	Left Bank	10		9		8	7	6			(5)	4	3			2	1	0			
	SCORE 5 (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 9 (LB)	Left Bank	10		(9)		8	7	6			5	4	3			2	1	0			
	SCORE 9 (RB)	Right Bank	10		(9)		8	7	6			5	4	3			2	1	0			

Total Score 112

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME KY-CS875_ST05	LOCATION Madison County, KY	
STATION # NA RIVERMILE NA	STREAM CLASS Perennial	
LAT 37.815169 LONG -84.241801	RIVER BASIN 05100205	
STORET # NA	AGENCY NA	
INVESTIGATORS AF / JM		
FORM COMPLETED BY AF / JM	DATE 8/13/14 TIME NR AM PM	REASON FOR SURVEY Pipeline construction

	Habitat Parameter	Condition Category			
		Optimal	**Suboptimal**	**Marginal**	**Poor**
Parameters to be evaluated in sampling reach	**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 14	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 11	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). (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 12	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 15	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 13	20 19 18 17 16	15 14 **13** 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
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 17	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 (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 16	20 19 18 17 **16**	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
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 8 (LB)	Left Bank 10 9	**8** 7 6	5 4 3	2 1 0
SCORE 8 (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; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE 8 (LB)	Left Bank 10 9	**8** 7 6	5 4 3	2 1 0
SCORE 8 (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 5 (LB)	Left Bank 10 9	8 7 6	**5** 4 3	2 1 0
SCORE 9 (RB)	Right Bank 10 **9**	8 7 6	5 4 3	2 1 0

Total Score 144

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME KY-CS875_ST06	LOCATION Madison County, KY	
STATION # NA RIVERMILE NA	STREAM CLASS Perennial	
LAT 37.810246 LONG -84.258852	RIVER BASIN 05100205	
STORET # NA	AGENCY NA	
INVESTIGATORS AF / JM		
FORM COMPLETED BY AF / JM	DATE 8/13/14 TIME NR AM PM	REASON FOR SURVEY Pipeline construction

Parameters to be evaluated in sampling reach	Habitat Parameter	Condition Category: 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 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 11	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 12	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). (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 11	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 13	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 11	20 19 18 17 16	15 14 13 12 **11**	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
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 15	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 (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 16	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
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 8 (LB)	Left Bank 10 9	(8) 7 6	5 4 3	2 1 0
SCORE 8 (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; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE 8 (LB)	Left Bank 10 9	(8) 7 6	5 4 3	2 1 0
SCORE 8 (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 9 (LB)	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0
SCORE 9 (RB)	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0

Total Score 139

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME KY-CS875_ST07	LOCATION Madison County, KY	
STATION # NA RIVERMILE NA	STREAM CLASS Intermittent	
LAT 37.809943 LONG -84.259340	RIVER BASIN 05100205	
STORET # NA	AGENCY NA	
INVESTIGATORS AF / JM		
FORM COMPLETED BY AF / JM	DATE 8/13/14 TIME NR AM PM	REASON FOR SURVEY Pipeline construction

Parameters to be evaluated in sampling reach	Habitat Parameter	Condition Category: 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 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 7	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 11	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). (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 10	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 13	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 6	20 19 18 17 16	15 14 13 12 11	10 9 8 7 **6**	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach	Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
	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 15	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 (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 7	20 19 18 17 16	15 14 13 12 11	10 9 8 (7) 6	5 4 3 2 1 0
	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 8 (LB)	Left Bank 10 9	(8) 7 6	5 4 3	2 1 0
	SCORE 8 (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; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE 6 (LB)	Left Bank 10 9	8 7 (6)	5 4 3	2 1 0
	SCORE 6 (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 8 (LB)	Left Bank 10 9	(8) 7 6	5 4 3	2 1 0
	SCORE 8 (RB)	Right Bank 10 9	(8) 7 6	5 4 3	2 1 0

Total Score 113

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME KY-CS875_ST08	LOCATION Madison County, KY	
STATION # NA RIVERMILE NA	STREAM CLASS Perennial	
LAT 37.808135 LONG -84.252381	RIVER BASIN 05100205	
STORET # NA	AGENCY NA	
INVESTIGATORS AF / JM		
FORM COMPLETED BY AF / JM	DATE 8/14/14 TIME NR AM PM	REASON FOR SURVEY Pipeline construction

	Habitat Parameter	Condition Category			
		Optimal	Suboptimal	Marginal	Poor
Parameters to be evaluated in sampling reach	**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 11	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 11	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). (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 12	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 12	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 11	20 19 18 17 16	15 14 13 12 **(11)**	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach	Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
	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 17	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 (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 16	20 19 18 17 **16**	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	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 7 (LB)	Left Bank 10 9	8 **7** 6	5 4 3	2 1 0
	SCORE 7 (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; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE 6 (LB)	Left Bank 10 9	8 7 **6**	5 4 3	2 1 0
	SCORE 6 (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 8 (LB)	Left Bank 10 9	**8** 7 6	5 4 3	2 1 0
	SCORE 8 (RB)	Right Bank 10 9	**8** 7 6	5 4 3	2 1 0

Total Score 132

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME KY-CS875_ST09	LOCATION Madison County, KY	
STATION # NA RIVERMILE NA	STREAM CLASS Intermittent	
LAT 37.808152 LONG -84.253069	RIVER BASIN 05100205	
STORET # NA	AGENCY NA	
INVESTIGATORS AF / JM		
FORM COMPLETED BY AF / JM	DATE 8/14/14 TIME NR AM PM	REASON FOR SURVEY Pipeline construction

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	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 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 8	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 11	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). (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 10	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 16	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 5	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	**5** 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
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 16	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 (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 9	20 19 18 17 16	15 14 13 12 11	10 **9** 8 7 6	5 4 3 2 1 0
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 7 (LB)	Left Bank 10 9	8 **7** 6	5 4 3	2 1 0
SCORE 7 (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; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE 6 (LB)	Left Bank 10 9	8 7 **6**	5 4 3	2 1 0
SCORE 6 (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 8 (LB)	Left Bank 10 9	**8** 7 6	5 4 3	2 1 0
SCORE 8 (RB)	Right Bank 10 9	**8** 7 6	5 4 3	2 1 0

Total Score 117

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME KY-CS875_ST10	LOCATION Madison County, KY	
STATION # NA RIVERMILE NA	STREAM CLASS Intermittent	
LAT 37.809138 LONG -84.251021	RIVER BASIN 05100205	
STORET # NA	AGENCY NA	
INVESTIGATORS AF / JM		
FORM COMPLETED BY AF / JM	DATE 8/14/14 TIME NR AM PM	REASON FOR SURVEY Pipeline construction

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category: 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 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 8	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 11	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). (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 10	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 16	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 4	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 **4** 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
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 16	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 (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	20 19 18 17 16	15 14 13 12 11	10 9 **8** 7 6	5 4 3 2 1 0
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 6 (LB)	Left Bank 10 9	8 7 **6**	5 4 3	2 1 0
SCORE 6 (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; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE 6 (LB)	Left Bank 10 9	8 7 **6**	5 4 3	2 1 0
SCORE 6 (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 7 (LB)	Left Bank 10 9	8 **7** 6	5 4 3	2 1 0
SCORE 7 (RB)	Right Bank 10 9	8 **7** 6	5 4 3	2 1 0

Total Score 111

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (FRONT)

STREAM NAME KY-GA-PS06_ST01	LOCATION Garrard County, KY	
STATION # NA RIVERMILE NA	STREAM CLASS Ephemeral	
LAT 37.671431 LONG -84.533139	RIVER BASIN 05100205	
STORET # NA	AGENCY NA	
INVESTIGATORS PF / PP		
FORM COMPLETED BY PF	DATE 10/24/14 TIME 10:00 (AM) PM	REASON FOR SURVEY Pipeline construction

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% 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).	30-50% 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).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE 5	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE 5	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE 0	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 <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% 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 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 6	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 0	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 (0)

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
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 15	20 19 18 17 16	**15** 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE 10	20 19 18 17 16	15 14 13 12 11	**10** 9 8 7 6	5 4 3 2 1 0
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.
SCORE 5 (LB)	Left Bank 10 9	8 7 6	**5** 4 3	2 1 0
SCORE 5 (RB)	Right Bank 10 9	8 7 6	**5** 4 3	2 1 0
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream.	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 8 (LB)	Left Bank 10 9	**8** 7 6	5 4 3	2 1 0
SCORE 8 (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 5 (LB)	Left Bank 10 9	8 7 6	**5** 4 3	2 1 0
SCORE 5 (RB)	Right Bank 10 9	8 7 6	**5** 4 3	2 1 0

Total Score 77

Appendix D Soil Types Within the Project Area

Workspace/Lateral	Map Unit Symbol	Hydric Category	Map Unit Name
CS 110/KY0070/PS-04	Cu	Non-Hydric Soils	Cuba silt loam
CS 110/KY0070/PS-04	CrF	Non-Hydric Soils	Cranston gravelly silt loam, 30 to 60 percent slopes
CS 110/KY0070/PS-04	CrE	Non-Hydric Soils	Cranston gravelly silt loam, 20 to 30 percent slopes
CS 110/KY0070/PS-04	CrC	Non-Hydric Soils	Cranston gravelly silt loam, 6 to 12 percent slopes
CS 110/KY0070/PS-04	CrC	Non-Hydric Soils	Cranston gravelly silt loam, 6 to 12 percent slopes
CS 110/KY0070/PS-04	WtA	Non-Hydric Soils	Whitley silt loam, terrace, 0 to 2 percent slopes
CS 110/KY0070/PS-04	Jo	Partially Hydric Soils	Johnsburg silt loam
KY0080	TlB	Non-Hydric Soils	Tilsit silt loam, 2 to 6 percent slopes
KY0080	Bo	Predominantly Hydric Soils	Bonnie silt loam
KY0100	LaD	Non-Hydric Soils	Latham silt loam, 12 to 20 percent slopes
KY0100	TlB	Non-Hydric Soils	Tilsit silt loam, 2 to 6 percent slopes
KY0100	TlC	Non-Hydric Soils	Tilsit silt loam, 6 to 12 percent slopes
KY0100	TlB	Non-Hydric Soils	Tilsit silt loam, 2 to 6 percent slopes
KY0110	JoA	Partially Hydric Soils	Johnsburg silt loam, 0 to 4 percent slopes
KY0110	Ho	Predominantly Hydric Soils	Holly loam, 0 to 2 percent slopes, frequently flooded
KY0120	LeC	Non-Hydric Soils	Lenberg silt loam, 6 to 12 percent slopes, eroded
KY0120	TiB	Non-Hydric Soils	Tilsit silt loam, 0 to 6 percent slopes
PS-05	SeE	Non-Hydric Soils	Shrouts-Woolper complex, 15 to 35 percent slopes
PS-05	AgC2	Non-Hydric Soils	Allegheny loam, 6 to 15 percent slopes, eroded
PS-05	AgB	Non-Hydric Soils	Allegheny loam, 2 to 6 percent slopes
KY0130	SeE	Non-Hydric Soils	Shrouts-Woolper complex, 15 to 35 percent slopes
KY0130	AgC2	Non-Hydric Soils	Allegheny loam, 6 to 15 percent slopes, eroded
KY0130	AgB	Non-Hydric Soils	Allegheny loam, 2 to 6 percent slopes
MLV-A09	FpD	Non-Hydric Soils	Fleming-Shrouts complex, 12 to 20 percent slopes (beasley-shrouts)
MLV-A09	CtC	Non-Hydric Soils	Colyer silt loam, 6 to 12 percent slopes
MLV-A09	FpC	Non-Hydric Soils	Fleming-Shrouts complex, 6 to 12 percent slopes (beasley-shrouts)
MLV-A09	TsB	Non-Hydric Soils	Tilsit silt loam, 2 to 6 percent slopes
MLV-A10	TaC	Non-Hydric Soils	Tate fine sandy loam, 6 to 12 percent slopes
MLV-A10	ErC	Non-Hydric Soils	Elk silt loam, 6 to 12 percent slopes, rarely flooded
MLV-A10	BaD	Non-Hydric Soils	Beasley silt loam, 12 to 20 percent slopes
MLV-A10	FdC	Non-Hydric Soils	Faywood silt loam, 6 to 12 percent slopes
MLV-A10	SrE	Non-Hydric Soils	Shrouts silty clay loam, 12 to 30 percent slopes
MLV-A10	OtE	Non-Hydric Soils	Otway silty clay, 12 to 30 percent slopes (shrouts)
KY0150	MuB	Non-Hydric Soils	Mercer silt loam, 2 to 6 percent slopes
KY0150	Lc	Partially Hydric Soils	Lawrence silt loam
CS 875 (KY0155)	BrE	Non-Hydric Soils	Brassfield silt loam, 12 to 30 percent slopes
CS 875 (KY0155)	BaC	Non-Hydric Soils	Beasley silt loam, 6 to 12 percent slopes
CS 875 (KY0155)	ShB	Non-Hydric Soils	Shelbyville silt loam, 2 to 6 percent slopes
CS 875 (KY0155)	ErC	Non-Hydric Soils	Elk silt loam, 6 to 12 percent slopes, rarely flooded
CS 875 (KY0155)	BrC	Non-Hydric Soils	Brassfield silt loam, 6 to 12 percent slopes
CS 875 (KY0155)	OtC	Non-Hydric Soils	Otway silty clay, 6 to 12 percent slopes (shrouts)
CS 875 (KY0155)	BcC3	Non-Hydric Soils	Beasley silty clay loam, 6 to 12 percent slopes, severely eroded
CS 875 (KY0155)	OtE	Non-Hydric Soils	Otway silty clay, 12 to 30 percent slopes (shrouts)
CS 875 (KY0155)	CaC	Non-Hydric Soils	Caleast silt loam, 6 to 12 percent slopes
CS 875 (KY0155)	Bo	Non-Hydric Soils	Boonesboro silt loam
CS 875 (KY0155)	EkA	Non-Hydric Soils	Elk silt loam, 0 to 2 percent slopes
CS 875 (KY0155)	ShC	Non-Hydric Soils	Shelbyville silt loam, 6 to 12 percent slopes
CS 875 (KY0155)	MuB	Non-Hydric Soils	Mercer silt loam, 2 to 6 percent slopes
CS 875 (KY0155)	Ld	Non-Hydric Soils	Lindside silt loam
CS 875 (KY0155)	Ne	Partially Hydric Soils	Newark silt loam, 0 to 2 percent slopes, occasionally flooded
KY0160/KY0170	CaC	Non-Hydric Soils	Caleast silt loam, 6 to 12 percent slopes
KY0160/KY0170	FdE	Non-Hydric Soils	Faywood silt loam, 12 to 30 percent slopes
KY0180	MuB	Non-Hydric Soils	Mercer silt loam, 2 to 6 percent slopes
KY0180	CwE	Non-Hydric Soils	Culleoka flaggy silt loam, 20 to 30 percent slopes
PS-06	EfF2	Non-Hydric Soils	Eden-Culleoka association, 25 to 50 percent slopes, eroded, stony
PS-06	LoB	Non-Hydric Soils	Lowell silt loam, 2 to 6 percent slopes
PS-06	CuD2	Non-Hydric Soils	Culleoka silt loam, 12 to 25 percent slopes, eroded
KY0190	LoC2	Non-Hydric Soils	Lowell silt loam, 6 to 12 percent slopes, eroded
MLV-A11	LsC2	Non-Hydric Soils	Lowell silt loam, phosphatic, 6 to 12 percent slopes, eroded
MLV-A11	uBlmB	Non-Hydric Soils	Bluegrass-Maury silt loams, 2 to 6 percent slopes
Dix River HDD	RoF	Non-Hydric Soils	Rock outcrop-Fairmount complex, 50 to 120 percent slopes
Dix River HDD	FfD2	Non-Hydric Soils	Faywood-Fairmount complex, phosphatic, 12 to 25 percent slopes, eroded, very rocky

Workspace/Lateral	Map Unit Symbol	Hydric Category	Map Unit Name
Dix River HDD	uBlmB	Non-Hydric Soils	Bluegrass-Maury silt loams, 2 to 6 percent slopes
Dix River HDD	CaC	Non-Hydric Soils	Caleast silt loam, 6 to 12 percent slopes
Dix River HDD	McD	Non-Hydric Soils	McAfee silt loam, 12 to 20 percent slopes
Dix River HDD	McB	Non-Hydric Soils	McAfee silt loam, 2 to 6 percent slopes
KY0220	CaB	Non-Hydric Soils	Caleast silt loam, 2 to 6 percent slopes
KY0220	CaC	Non-Hydric Soils	Caleast silt loam, 6 to 12 percent slopes
KY0220	CaC	Non-Hydric Soils	Caleast silt loam, 6 to 12 percent slopes
MLV-A12	CaC	Non-Hydric Soils	Caleast silt loam, 6 to 12 percent slopes
MLV-A12	McD	Non-Hydric Soils	McAfee silt loam, 12 to 20 percent slopes
KY0230	LoC	Non-Hydric Soils	Lowell silt loam, 6 to 12 percent slopes
KY0240/KY0250	LoB	Non-Hydric Soils	Lowell silt loam, 2 to 6 percent slopes
KY0240/KY0250	LoC	Non-Hydric Soils	Lowell silt loam, 6 to 12 percent slopes
KY0260	EeE3	Non-Hydric Soils	Eden flaggy silty clay, 20 to 30 percent slopes, severely eroded
KY0260	LoC	Non-Hydric Soils	Lowell silt loam, 6 to 12 percent slopes
KY0260	No	Partially Hydric Soils	Nolin silt loam, 0 to 2 percent slopes, frequently flooded
KY0280	CrB	Non-Hydric Soils	Crider silt loam, 2 to 6 percent slopes
KY0290	La	Partially Hydric Soils	Lawrence silt loam
KY0290	TbA	Non-Hydric Soils	Tilsit-Berea silt loams, 0 to 2 percent slopes
KY0290	La	Partially Hydric Soils	Lawrence silt loam
KY0310	TbC2	Non-Hydric Soils	Tilsit-Berea silt loams, 6 to 12 percent slopes, eroded
KY0310	RtF2	Non-Hydric Soils	Rohan-Trappist complex, 20 to 50 percent slopes, eroded, very rocky
KY0310	La	Partially Hydric Soils	Lawrence silt loam
PS-07	TeC2	Non-Hydric Soils	Trappist-Jessietown complex, 6 to 12 percent slopes, eroded
PS-07	TbB	Non-Hydric Soils	Tilsit-Berea silt loams, 2 to 6 percent slopes
KY0330	MoB	Non-Hydric Soils	Mountview silt loam, 2 to 6 percent slopes
KY0330	FrC	Non-Hydric Soils	Frederick silt loam, 6 to 12 percent slopes
KY0340	MoB	Non-Hydric Soils	Mountview silt loam, 2 to 6 percent slopes
KY0340	FrC	Non-Hydric Soils	Frederick silt loam, 6 to 12 percent slopes
KY0350	MoB	Non-Hydric Soils	Mountview silt loam, 2 to 6 percent slopes
KY0360	FaC2	Non-Hydric Soils	Frederick silt loam, 6 to 12 percent slopes, eroded
KY0360	FaB2	Non-Hydric Soils	Frederick silt loam, 2 to 6 percent slopes, eroded
PS-08	CtB2	Non-Hydric Soils	Cumberland cherty silt loam, 2 to 6 percent slopes, eroded (baxter)
PS-08	CtC2	Non-Hydric Soils	Cumberland cherty silt loam, 6 to 12 percent slopes, eroded (baxter)
PS-08	PbB	Non-Hydric Soils	Pembroke silt loam, 2 to 6 percent slopes
KY0370	CtB2	Non-Hydric Soils	Cumberland cherty silt loam, 2 to 6 percent slopes, eroded (baxter)
KY0370	CtC2	Non-Hydric Soils	Cumberland cherty silt loam, 6 to 12 percent slopes, eroded (baxter)
KY0380	CtB2	Non-Hydric Soils	Cumberland cherty silt loam, 2 to 6 percent slopes, eroded (baxter)
KY0380	CtC2	Non-Hydric Soils	Cumberland cherty silt loam, 6 to 12 percent slopes, eroded (baxter)
KY0400	ChC2	Non-Hydric Soils	Christian gravelly silt loam, 6 to 12 percent slopes, eroded
KY0400	MoB	Non-Hydric Soils	Mountview silt loam, 2 to 6 percent slopes
KY0410	ChC2	Non-Hydric Soils	Christian gravelly silt loam, 6 to 12 percent slopes, eroded
KY0420	BeB	Non-Hydric Soils	Bedford silt loam, 2 to 6 percent slopes
KY0420	ChD2	Non-Hydric Soils	Christian gravelly silt loam, 12 to 20 percent slopes, eroded
PS-09	CaE2	Non-Hydric Soils	Caneyville-Rock outcrop complex, 20 to 50 percent slopes, eroded
PS-09	ChD2	Non-Hydric Soils	Christian gravelly silt loam, 12 to 20 percent slopes, eroded
PS-09	ChB2	Non-Hydric Soils	Christian gravelly silt loam, 2 to 6 percent slopes, eroded
PS-09	ChC2	Non-Hydric Soils	Christian gravelly silt loam, 6 to 12 percent slopes, eroded
PS-09	CaD2	Non-Hydric Soils	Caneyville-Rock outcrop complex, 12 to 20 percent slopes, eroded
KY0430	BaB	Non-Hydric Soils	Baxter cherty silt loam, 2 to 6 percent slopes
KY0430	BaC	Non-Hydric Soils	Baxter cherty silt loam, 6 to 12 percent slopes

Appendix E Site Photographs

Photo 1. KY-RO-PS04_ST01; representative view of nearby stream

Photo 2. KY-RO-PS04_ST02; representative view of nearby stream

Photo 3. KY-RO-PS04_ST03; view northwest, upstream

Photo 4. KY-RO-PS04_ST03; view southeast, downstream

Photo 5. KY0110_WL01; view northwest

Photo 6. KY-CS875_WL01; wetland view

Photo 7. KY-CS875_WL02; wetland view

Photo 8. KY-CS875_WL03; wetland view

Photo 9. KY-CS875_WL04; wetland view

Photo 10. KY-CS875_WL05; wetland view

Photo 11. KY-CS875_ST01; view east, upstream

Photo 12. KY-CS875_ST01; view west, downstream

Photo 13. KY-CS875_ST02; view east, upstream

Photo 14. KY-CS875_ST02; view west, downstream

Photo 15. KY-CS875_ST03; view east, upstream

Photo 16. KY-CS875_ST03; view west, downstream

Photo 17. KY-CS875_ST04; view upstream

Photo 18. KY-CS875_ST04; view downstream

Photo 19. KY-CS875_ST05; view south, upstream

Photo 20. KY-CS875_ST05; view north, downstream

Photo 21. KY-CS875_ST06 view upstream

Photo 22. KY-CS875_ST06; view downstream

Photo 23. KY-CS875_ST07; view upstream

Photo 24. KY-CS875_ST07; view downstream

Photo 25. KY-CS875_ST08; view east, upstream

Photo 26. KY-CS875_ST08; view west, downstream

Photo 27. KY-CS875_ST09; view upstream

Photo 28. KY-CS875_ST09; view downstream

Photo 29. KY-CS875_ST10; view upstream

Photo 30. KY-CS875_ST10; view downstream

Photo 31. KY-CS875_OW01; view east

Photo 32. KY-CS875_OW02; view north

Photo 33. KY-GA-PS06_ST01; representative view of similar stream


Photo 34. KY0310E_WL01; view northeast

Photo 35. KY-MA-PS07_WL01; view northwest

Photo 36. KY-MA-PS07_WL02; representative view of nearby wetland

Photo 37. KY-MA-PS07_OW01; view north

Appendix F Delineator Qualifications

Roster of Wetland Delineator Field Leads – ACRP and UMTP Project

Name	Company	Education	Certifications	Summary of Experience
Zachary Bradford	Stantec	B.S. Biology, College of William and Mary; B.S. Environmental Science, College of William and Mary.	U.S. Fish and Wildlife approved surveyor for *Isotria medeoloides* and *Echinacea laevigata*.	1.5 years of wetland delineation experience including over 100 miles of linear utility right-of-way.
Ray Dennis	Stantec	B.S. Biological Sciences, Florida Institute of Technology, 1995.	Professional Wetland Scientist Cert. #2054.	Fourteen years experience with project management, wetland delineation, permitting, NEPA studies and wildlife management.
Kalin Drennen	Wallace & Pancher, Inc.[1]	B.S. Environmental Geosciences, Slippery Rock University, 2009.	Richard Chinn Wetland Delineation Training, 2014.	Four years of experience with linear and energy related projects. Team lead specializing in aquatic assessments, flow monitoring, data collection, plant and tree identification.
Pam Ferral	Stantec	B.S. Fisheries and Wildlife Science, North Carolina State University, 1985; M.S. Wildlife Science, North Carolina State University, 1996.	Certified Wildlife Biologist.	Certified Wildlife Biologist, 25 years of experience conducting natural and water resources studies, including wetland delineation, verification, mitigation, and permitting; protected species surveys and environmental assessments. For the past seven years her focus has been providing environmental services for linear infrastructure projects including pipelines, transmission lines and transportation.

Name	Company	Education	Certifications	Summary of Experience
Chuck Ferris	Stantec	B.S. Wildlife and Conservation Biology, University of Rhode Island, 2005.	State of New Hampshire Certified Professional Wetland Scientist #279.	Eight years consulting experience with primary focus on wetland delineations and wildlife investigations.
John Freeland	Stantec	B.S. Geology, Grand Valley State University, 1982; M.S. Soil Science, University of New Hampshire, 1992; Ph.D. Soil Science, North Dakota State University, 1997.	Professional Wetland Scientist Cert. #1264. Qualified Data Collector (QDC) Level 2 Stream Habitat Assessment – QHEI, Ohio EPA Surface Water Credible Data Program, License 00917.	25 years experience with hydric soil investigations, 18 years wetland and environmental consultant. Field methodology and data QA/QC for ACRP and UMTP project.
Adam Gailey	Wallace & Pancher, Inc.[1]	B.S. Environmental Studies, University of Pittsburgh, 2001; M.S. Environmental Science and Management, Duquesne University, 2014.	Wetland Delineator Certification Program, 2003; Ohio Department of transportation Ecological/Waterway Permits Training 2011-2014; Ohio Rapid Assessment Method for Wetlands 2004.	Twelve years experience as natural and aquatic resource investigations, wetland and stream investigations, report documentation, Jurisdictional Determinations, field team oversight and permit applications.
Derek Huebsch	Stantec	B.S. Ecology and Environmental Biology, University of Wisconsin-LaCrosse, 2014.	Basic and advanced wetland delineation training, University of Wisconsin – La Crosse, 2012.	Approximately 2.5 years experience with wetland delineation, beginning with Wisconsin Department of Transportation internship.
Michelle Kearns	Stantec	University of Dayton, B.S., 1997 Indiana University, M.S., Environmental Science, 1999.	Professional Wetland Scientist cert. #1566.	Conducting wetland delineations for approximately 15 years. Has been a team lead on several large pipeline projects including ACRP and UMTP Project.

Name	Company	Education	Certifications	Summary of Experience
Scott Kupiec	Stantec	B.S. Environmental Science, University of Virginia, 2006.	Professional Wetland Delineator, Department of Professional and Occupational Regulation, Commonwealth of Virginia cert# 3402000145, 2013.	Approximately 9 years consulting experience with approximately 7 years as technical lead. Primary focus of responsibilities includes wetland delineation and permitting, stream assessments, and threatened and endangered species surveys.
Bill Leopold	Stantec	M.S. Marine Science, University of California, Stanislaus 2000; B.S. Biology, Eastern Kentucky University, 1990.	NA[2]	9 years consulting experience, 7 years as lead ecological investigator, primarily focusing on wetland and stream studies, restorations and permitting.
Jason Mann	Stantec	B.S. Forestry and Environmental Resource Management, Virginia Tech, 2001.	NA[2]	15 years environmental consulting with focus on wetland delineations, stream assessments, threatened and endangered species surveys. Approximately 5 years experience as a technical lead and project manager.
Cheryl Matasovsky	Stantec	B.S. Biology, Clemson University, 2001; M.S. Environmental Biology, Towson University, 2003.	Ecological Society of America Certified Ecologist.	Approximately 10 years experience with ecological assessments, wetland delineations, threatened & endangered species surveys, wildlife studies. Eight years as senior ecologist leading surveys.
Eric McCleary	Stantec	B.S. Biology, Clarion University of Pennsylvania, 1989; M.S. Evolutionary Ecology/Herpetology, Kent State University, 1994.	NA[2]	Over 25 years experience in the area of wetland delineation and mitigation, environmental assessments, environmental impact statements, watershed restoration, and plant and animal identification.

Name	Company	Education	Certifications	Summary of Experience
David Miller	Wallace & Pancher, Inc.[1]	B.S. Environmental and Natural Resources in Economics, West Virginia University, 2009.	ACOE 38-hour Wetland Delineator Training, 2014.	Five years experience with natural and aquatic resource investigations, including wetland and stream delineations. Focus on energy projects.
Greg Moore	Wallace & Pancher, Inc.[1]	B.S. Environmental Studies, Fisheries and Wildlife Biology, California University of Pennsylvania, 2009.	ACOE 38-hour Wetland Delineator Training, 2014. Scientific collector permits for Pennsylvania and West Virginia.	Six years experience in environmental consulting with concentration in wetland and stream assessments.
Sara Rair	Wallace & Pancher, Inc.[1]	B.S. Psychology, University of North Carolina at Wilmington, 2006; M.S. Biology/Aquatic Ecology, Youngstown State University, 2011.	Wetland Delineator Certification, 2014. Society of Freshwater Science EPT taxonomy certification.	Approximately 2 years experience as wetland delineator field team supervisor and macroinvertebrate taxonomist. Focus on linear energy projects.
Todd Shnackenburg	TRC Environmental Corporation	B.S. Biology, University of Texas-Austin, 2010.	USACE Wetland Delineation training 2011.	Approximately 3.5 years in environmental consulting with 2 years as a technical lead. Primary focus on wetland delineations, stream assessments, permitting, and threatened and endangered species surveys.

Name	Company	Education	Certifications	Summary of Experience
Angela Sjollema	Stantec	B.S. Wildlife Biology, University of Minnesota, 2003; M.S. Wildlife Biology Frostburg State University, 2011.	Wetland Delineation Training, Institute for Wetland and Environmental Education and Research, Inc., Columbus, Ohio, 2012. Identifying Grasses, Sedges, and Rushes course, Wetland Training Institute, Pittsburgh, Pennsylvania, 2014. Ohio Rapid Assessment Method (ORAM) for Wetlands v. 5.0 Training Course, Ohio EPA, Groveport, Ohio, 2014, certified associate wildlife biologist	Approximately 3 years of wetland and stream assessment experience, including role as technical lead. Nine years experience in wildlife investigations and management including freshwater mussel, raptor, and bat surveys.
Jason Teschler	Stantec	Studies in Natural Resources, University of Wisconsin-Stevens Point, 2001-2005.	Rosgen IV Stream Restoration Training	Seven years of experience as an environmental consultant focusing on wetland delineations and stream restoration.

[1]Wallace & Pancher, Inc. was subcontractor to Stantec.

[2]NA=none applicable

Attachment 5 USACE Waters Upload and Impacts Tables

USACE Louisville District
Waters Upload Table

Waters_Name	Cowardin_Code	HGM_Code	Measurement_Type	Amount	Units	Waters_Type	Latitude	Longitude	Local_Waterway
KY0110_WL01-PEM-PE	PEM		Area	0.0176	ACRE	DELINEATE	38.061782	-83.672771	
KY0110_WL01-PEM-TWS	PEM		Area	0.0106	ACRE	DELINEATE	38.061744	-83.672692	
KY0310E_WL01-PEM-PE	PEM		Area	0.0263	ACRE	DELINEATE	37.497149	-85.291548	
KY-GA-PS06-ST01-EPH-TWS	R4SB	RIVERINE	Area	0	ACRE	RPW	37.671405	-84.533174	None
KY-MA-PS07_OW01-PUB-PI	PUB		Area	0.279	ACRE		37.489505	-85.30613	None
KY-MA-PS07_OW01-PUB-TWS	PUB		Area	0.0561	ACRE		37.489604	-85.306258	None
KY-MA-PS07_WL01-PEM-TWS	PEM		Area	0.0209	ACRE	RPWWN	37.489652	-85.30643	
KY-MA-PS07_WL02-PEM-PI	PEM		Area	0.0836	ACRE	DELINEATE	37.488998	-85.306599	
KY-MA-PS07_WL02-PEM-TWS	PEM		Area	0.0306	ACRE	DELINEATE	37.489233	-85.306884	
KY-RO-PS04_ST01-IT-PI	R4SB	RIVERINE	Area	0.0359	ACRE	NPW	38.287903	-83.404361	None
KY-RO-PS04_ST02-IT-PI	R4SB	RIVERINE	Area	0.0046	ACRE	NPW	38.287693	-83.404635	None
KY-RO-PS04_ST03-IT-PI	R4SB	RIVERINE	Area	0.0067	ACRE	NPW	38.28786	-83.40469	None

* A Definition Guide is provided at the end of PCN Attachment 5. This footnote is not included on the Excel version of the Waters Upload and Impacts Tables.

USACE Louisville District
Waters Impacts Table

Waters_Name	Name	Activity	Resource_Type	Permanent_Loss	Impact_Duration	Initially_Proposed_Area	Proposed_Area	Authorized_Area	Units_Area	Area_Type	Initially_Proposed_Linear	Proposed_Linear	Authorized_Linear	Units_Linear	Debits	Notes
KY0110_WL01-PEM-PE	KY0110_WL01	Excavation associated with the discharge of dredged or fill material	Non-Tidal Wetland	NO	Temporary	0.017584			Acres					Feet		
KY0110_WL01-PEM-TWS	KY0110_WL01	Excavation associated with the discharge of dredged or fill material	Non-Tidal Wetland	NO	Temporary	0.010603			Acres					Feet		
KY0310E_WL01-PEM-PE	KY0310E_WL01	Excavation associated with the discharge of dredged or fill material	Non-Tidal Wetland	NO	Temporary	0.026256			Acres					Feet		
KY-GA-PS06-ST01-EPH-TWS	KY-GA-PS06-ST01	Excavation associated with the discharge of dredged or fill material	River/Stream	NO	Temporary	0			Acres		0			Feet		
KY-MA-PS07_OW01-PUB-PI	KY-MA-PS07_OW01	Discharge of fill material	Pond	YES	Permanent	0.279035			Acres					Feet		
KY-MA-PS07_OW01-PUB-TWS	KY-MA-PS07_OW01	Excavation associated with the discharge of dredged or fill material	Pond	NO	Temporary	0.05607			Acres					Feet		
KY-MA-PS07_WL01-PEM-TWS	KY-MA-PS07_WL01	Excavation associated with the discharge of dredged or fill material	Non-Tidal Wetland	NO	Temporary	0.020851			Acres					Feet		
KY-MA-PS07_WL02-PEM-PI	KY-MA-PS07_WL02	Discharge of fill material	Non-Tidal Wetland	YES	Permanent	0.083552			Acres					Feet		
KY-MA-PS07_WL02-PEM-TWS	KY-MA-PS07_WL02	Excavation associated with the discharge of dredged or fill material	Non-Tidal Wetland	NO	Temporary	0.030648			Acres					Feet		
KY-RO-PS04_ST01-IT-PI	KY-RO-PS04_ST01	Discharge of fill material	River/Stream	YES	Permanent	0.035937			Acres		391.351537			Feet		
KY-RO-PS04_ST02-IT-PI	KY-RO-PS04_ST02	Discharge of fill material	River/Stream	YES	Permanent	0.004599			Acres		133.56279			Feet		
KY-RO-PS04_ST03-IT-PI	KY-RO-PS04_ST03	Discharge of fill material	River/Stream	YES	Permanent	0.006703			Acres		145.997303			Feet		

* A Definition Guide is provided at the end of PCN Attachment 5. This footnote is not included on the Excel version of the Waters Upload and Impacts Tables.

Definition Guide

Waters_Type	Description
DELINEATE	Delineation only
TNW	TNWs, including territorial seas
TNWW	Wetlands adjacent to TNWs
RPW	Relatively Permanent Waters (RPWs) that flow directly or indirectly into TNWs
RPWWD	Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
RPWWN	Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
NRPW	Non-RPWs that flow directly or indirectly into TNWs
NRPWW	Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
ISOLATE	Isolated (interstate or intrastate) waters, including isolated wetlands
UPLAND	Uplands
TNWRPW	Tributary consisting of both RPWs and non-RPWs

HGM_Code	Name	Description
DEPRESS	Depressional	Depressional is characterized by a water source consisting of return flow from groundwater and interflow with primarily vertical hydrodynamics.
ESTUARINEF	Estuarine Fringed	The water source of the estuarine fringe consists of overbank flow from estuaries, with bidirectional and horizontal hydrodynamics being dominant.
LACUSTRINF	Lacustrine Fringe	A Lacustrine fringe has a dominant water source of lake overbank flow, and the dominant hydrodynamics are bidirectional and horizontal.
MINSOILFLT	Mineral Soil Flats	Mineral soil flats have a water source of precipitation, and vertical hydrodynamics are dominant.
ORGSOILFLT	Organic Soil Flats	Organic soil flats have precipitation as the water source, and its dominant hydrodynamic is vertical.
RIVERINE	Riverine	Riverine is characterized by a water source of overbank flow from a channel, and hydrodynamics which are predominantly unidirectional and horizontal.
SLOPE	Slope	The Slope wetland class is characterized by a water source of return flow from groundwater, with principally unidirectional and horizontal hydrodynamics.

Cowardin_Code	Category	Description	Name
E	Estuarine	Estuarine - Consists of deepwater tidal habitats and adjacent tidal wetlands that are usually semienclosesd by lan	E-ESTUARINE
E1	Estuarine	Subtidal, Estuarine	E1-ESTUARINE, SUBTIDAL
E1AB	Estuarine	Aquatic Bed, Estuarine	E1AB-ESTUARINE, SUBTIDAL, AQUATIC BED
E1AB1	Estuarine	Algal, Aquatic Bed, Subtidal, Estuarine	E1AB1-ESTUARINE, SUBTIDAL, AQUATIC BED, ALGAL
E1AB3	Estuarine	Rooted Vascular, Aquatic Bed, Subtidal, Estuarine	E1AB3-ESTUARINE, SUBTIDAL, AQUA BED, ROOT VASC
E1AB4	Estuarine	Floating Vascular, Aquatic Bed, Subtidal, Estuarine	E1AB4-ESTUARINE, SUBTIDAL, AQUA BED, FLOT VASC
E1AB5	Estuarine	Unknown Submergent, Aquatic Bed, Subtidal, Estuarine	E1AB5-ESTUARINE, SUBTIDAL, AQUA BED, UNK SUB
E1AB6	Estuarine	Unknown Surface, Aquatic Bed, Subtidal, Estuarine	E1AB6-ESTUARINE, SUBTIDAL, AQUA BED, UNK SUR
E1OW	Estuarine	Open Water, Subtidal, Estuarine (used on older maps)	E1OW-ESTUARINE, SUBTIDAL, OPEN WATER
E1RB	Estuarine	Rock Bottom, Subtidal, Estuarine	E1RB-ESTUARINE, SUBTIDAL, ROCK BOTTOM
E1RB1	Estuarine	Bedrock, Rock Bottom, Subtidal, Estuarine	E1RB1-ESTUARINE, SUBTIDAL, ROCK BOTTOM, BEDROK
E1RB2	Estuarine	Rubble, Rock Bottom, Subtidal, Estuarine	E1RB2-ESTUARINE, SUBTIDAL, ROCK BOTTOM, RUBBLE
E1RF	Estuarine	Reef, Subtidal, Estuarine	E1RF-ESTUARINE, SUBTIDAL, REEF
E1RF2	Estuarine	Mollusc, Reef, Subtidal, Estuarine	E1RF2-ESTUARINE, SUBTIDAL, REEF, MOLLUSC
E1RF3	Estuarine	Worm, Reef, Subtidal, Estuarine	E1RF3-ESTUARINE, SUBTIDAL, REEF, WORM
E1UB	Estuarine	Unconsolidated Bottom, Subtidal, Estuarine	E1UB-ESTUARINE, SUBTIDAL UNCONSOLIDATED BOTTM
E1UB1	Estuarine	Cobble-Gravel, Unconsolidated Bottom, Subtidal, Estuarine	E1UB1-ESTUARINE, SUBTIDAL, UNCONSOL BOTOM, COB
E1UB2	Estuarine	Sand, Unconsolidated Bottom, Subtidal, Estuarine	E1UB2-ESTUARINE, SUBTIDAL, UNCONSOL BOT, SAND
E1UB3	Estuarine	Mud, Unconsolidated Bottom, Subtidal, Estuarine	E1UB3-ESTUARINE, SUBTIDAL, UNCONSOL BOT, MUD
E1UB4	Estuarine	Organic, Unconsolidated Bottom, Subtidal, Estuarine	E1UB4-ESTUARINE, SUBTIDAL, UNCONSOL BOT, ORG
E2	Estuarine	Intertidal, Estuarine	E2-ESTUARINE, INTERTIDAL
E2AB	Estuarine	Aquatic Bed, Intertidal, Estuarine	E2AB-ESTUARINE, INTERTIDAL, AQUATIC BED
E2AB1	Estuarine	Algal, Aquatic, Bed, Intertidal, Estuarine	E2AB1-ESTUARINE, INTERTIDAL, AQUA BED, ALGAL
E2AB3	Estuarine	Rooted Vascular, Aquatic Bed, Intertidal, Estuarine	E2AB3-ESTUARINE, INTERTIDAL, AQUA BED, ROOT VA
E2AB4	Estuarine	Floating Vascular, Aquatic Bed, Intertidal, Estuarine	E2AB4-ESTUARINE, INTERTIDAL, AQUABED, FLOAT VA
E2AB5	Estuarine	Unknown Submergent, Aquatic Bed, Intertidal, Estuarine	E2AB5-ESTUARINE, INTERTIDAL, AQUABED, UNK SUB
E2AB6	Estuarine	Unknown Surface, Aquatic Bed, Intertidal, Estuarine	E2AB6-ESTUARINE, INTERTIDAL, AQUABED, UNK SUR
E2EM	Estuarine	Emergent, Intertidal, Estuarine	E2EM-ESTUARINE, INTERTIDAL, EMERGENT
E2EM1	Estuarine	Persistent, Emergent, Intertidal, Estuarine	E2EM1-ESTUARINE, INTERTIDAL, EMERGENT, PERSIST
E2EM2	Estuarine	Nonpersistent, Emergent, Intertidal, Estuarine	E2EM2-ESTUARINE, INTERTIDAL, EMERGENT, NONPERS
E2FO	Estuarine	Forested, Intertidal, Estuarine	E2FO-ESTUARINE, INTERTIDAL, FORESTED
E2FO1	Estuarine	Broad-Leaved Deciduous, Forested, Intertidal, Estuarine	E2FO1-ESTUARINE, INTERTIDAL, FORESTED, BLD
E2FO2	Estuarine	Needle-Leaved Deciduous, Forested, Intertidal, Estuarine	E2FO2-ESTUARINE, INTERTIDAL, FORESTED, NLD
E2FO3	Estuarine	Broad-Leaved Evergreen, Forested, Intertidal, Estuarine	E2FO3-ESTUARINE, INTERTIDAL, FORESTED, BLE
E2FO4	Estuarine	Needle-Leaved Evergreen, Forested, Intertidal, Estuarine	E2FO4-ESTUARINE, INTERTIDAL, FORESTED, NLE
E2FO5	Estuarine	Dead, Forested, Intertidal, Estuarine	E2FO5-ESTUARINE, INTERTIDAL, FORESTED, DEAD
E2FO6	Estuarine	Indeterminate Deciduous, Forested, Intertidal, Estuarine	E2FO6-ESTUARINE, INTERTIDAL, FORESTED, IND
E2FO7	Estuarine	Indeterminate Evergreen, Forested, Intertidal, Estuarine	E2FO7-ESTUARINE, INTERTIDAL, FORESTED, INE
E2RF	Estuarine	Reef, Intertidal, Estuarine	E2RF-ESTUARINE, INTERTIDAL, REEF
E2RF2	Estuarine	Mollusc, Reef, Intertidal, Estuarine	E2RF2-ESTUARINE, INTERTIDAL, REEF, MOLLUSC
E2RF3	Estuarine	Worm, Reef, Intertidal, Estuarine	E2RF3-ESTUARINE, INTERTIDAL, REEF, WORM
E2RS	Estuarine	Rocky Shore, Intertidal, Estuarine	E2RS-ESTUARINE, INTERTIDAL, ROCKY SHORE
E2RS1	Estuarine	Bedrock, Rocky Shore, Intertidal, Estuarine	E2RS1-ESTUARINE, INTERTIDAL, ROCK SHR, BEDROK
E2RS2	Estuarine	Rubble, Rocky Shore, Intertidal, Estuarine	E2RS2-ESTUARINE, INTERTIDAL, ROCK SHR, RUBBLE
E2SB	Estuarine	Stream Bed, Intertidal, Estuarine	E2SB-ESTUARINE, INTERTIDAL, STREAM BED
E2SB3	Estuarine	Cobble-Gravel, Stream Bed, Intertidal, Estuarine	E2SB3-ESTUARINE, INTERTIDAL, STREAM BED, COBBL
E2SB4	Estuarine	Sand, Stream Bed, Intertidal, Estuarine	E2SB4-ESTUARINE, INTERTIDAL, STREAM BED, SAND
E2SB5	Estuarine	Mud, Stream Bed, Intertidal, Estuarine	E2SB5-ESTUARINE, INTERTIDAL, STREAM BED, MUD
E2SB6	Estuarine	Organic, Stream Bed, Intertidal, Estuarine	E2SB6-ESTUARINE, INTERTIDAL, STREAM BED, ORGAN
E2SS	Estuarine	Scrub-Shrub, Intertidal, Estuarine	E2SS-ESTUARINE, INTERTIDAL, SCRUB-SHRUB
E2SS1	Estuarine	Broad-Leaved Deciduous, Scrub-Shrub, Intertidal, Estuarine	E2SS1-ESTUARINE, INTERTIDAL, SCRUB-SHRUB, BLD
E2SS2	Estuarine	Needle-Leaved Deciduous, Scrub-Shrub, Intertidal, Estuarine	E2SS2-ESTUARINE, INTERTIDAL, SCRUB-SHRUB, NLD
E2SS3	Estuarine	Broad-Leaved Evergreen, Scrub-Shrub, Intertidal, Estuarine	E2SS3-ESTUARINE, INTERTIDAL, SCRUB-SHRUB, BLE
E2SS4	Estuarine	Needle-Leaved Evergreen, Scrub-Shrub, Intertidal, Estuarine	E2SS4-ESTUARINE, INTERTIDAL, SCRUB-SHRUB, NLE
E2SS5	Estuarine	Dead, Scrub-Shrub, Intertidal, Estuarine	E2SS5-ESTUARINE, INTERTIDAL, SCRUB-SHRUB, DEAD
E2SS6	Estuarine	Indeterminate Deciduous, Scrub-Shrub, Intertidal, Estuarine	E2SS6-ESTUARINE, INTERTIDAL, SCRUB-SHRUB, IND
E2SS7	Estuarine	Indeterminate Evergreen, Scrub-Shrub, Intertidal, Estuarine	E2SS7-ESTUARINE, INTERTIDAL, SCRUB-SHRUB, INE
E2US	Estuarine	Unconsolidated Shore, Intertidal, Estuarine	E2US-ESTUARINE, INTERTIDAL, UNCONSOL SHORE
E2US1	Estuarine	Cobble, Unconsolidated Shore, Intertidal, Estuarine	E2US1-ESTUARINE, INTERTIDAL, UNCONSOL SHR, COB
E2US2	Estuarine	Sand, Unconsolidated Shore, Intertidal, Estuarine	E2US2-ESTUARINE, INTERTIDAL, UNCONSOL SHR, SAN
E2US3	Estuarine	Mud, Unconsolidated Shore, Intertidal, Estuarine	E2US3-ESTUARINE, INTERTIDAL, UNCONSOL BOT, MUD
E2US4	Estuarine	Organic, Unconsolidated Shore, Intertidal, Estuarine	E2US4-ESTUARINE, INTERTIDAL, UNCONSOL SHR, ORG
L	Lacustrine	Lacustrine - Includes wetlands and deepwater habitats with all of the following characteristics: (1) situated in a top	L-LACUSTRINE
L1	Lacustrine	Lacustrine - Includes wetlands and deepwater habitats with all of the following characteristics: (1) situated in a top	L1-LACUSTRINE, LIMNETIC
L1AB	Lacustrine	Aquatic Bed, Limnetic, Lacustrine	L1AB-LACUSTRINE, LIMNETIC, AQUA BED
L1AB1	Lacustrine	Algal, Aquatic Bed, Limnetic, Lacustrne	L1AB1-LACUSTRINE, LIMNETIC, AQUA BED, ALGAL
L1AB2	Lacustrine	Aquatic Moss, Aquatic Bed, Limnetic, Lacustrine	L1AB2-LACUSTRINE, LIMNETIC, AQUA BED, AQUA MOS
L1AB3	Lacustrine	Rooted Vascular, Aquatic Bed, Limnetic, Lacustrine	L1AB3-LACUSTRINE, LIMNETIC, AQUA BED, ROOT VAS
L1AB4	Lacustrine	Floating Vascular, Aquatic Bed, Limnetic, Lacustrine	L1AB4-LACUSTRINE, LIMNETIC, AQUA BED, FLOT VAS
L1AB5	Lacustrine	Unknown Submergent, Aquatic Bed, Limnetic, Lacustrine	L1AB5-LACUSTRINE, LIMNETIC, AQUA BED, UNK SUB
L1AB6	Lacustrine	Unknown Surface, Aquatic Bed, Limnetic, Lacustrine	L1AB6-LACUSTRINE, LIMNETIC, AQUA BED, UNK SURF
L1OW	Lacustrine	Open Water/Unknown Bottom, Limnetic, Lacustrine (used on older maps)	L1OW-LACUSTRINE, LIMNETIC, OPEN WATER/UNK BOT
L1RB	Lacustrine	Rock Bottom, Limnetic, Lacustrine	L1RB-LACUSTRINE, LIMNETIC, ROCK BOTTOM
L1RB1	Lacustrine	Bedrock, Rock Bottom, Limnetic, Lacustrine	L1RB1-LACUSTRINE, LIMNETIC, ROCK BOT, BEDROCK
L1RB2	Lacustrine	Rubble, Rock Bottom, Limnetic, Lacustrine	L1RB2-LACUSTRINE, LIMNETIC, ROCK BOT, RUBBLE
L1UB	Lacustrine	Unconsolidated Bottom, Limnetic, Lacustrine	L1UB-LACUSTRINE, LIMNETIC, UNCONSOL BOTTOM
L1UB1	Lacustrine	Cobble-Gravel, Unconsolidated Bottom, Limnetic, Lacustrine	L1UB1-LACUSTRINE, LIMNETIC, UNCONSOL BOT, COGGLE
L1UB2	Lacustrine	Sand, Unconsolidated Bottom, Limnetic, Lacustrine	L1UB2-LACUSTRINE, LIMNETIC, UNCONSOL BOT, SAND
L1UB3	Lacustrine	Mud, Unconsolidated Bottom, Limnetic, Lacustrine	L1UB3-LACUSTRINE, LIMNETIC, UNCONSOL BOT, MUD
L1UB4	Lacustrine	Organic, Unconsolidated Bottom, Limnetic, Lacustrine	L1UB4-LACUSTRINE, LIMNETIC, UNCONSOL BOT, ORGANI
L2	Lacustrine	Littoral, Lacustrine	L2-LACUSTRINE, LITTORAL
L2AB	Lacustrine	Aquatic Bed, Littoral, Lacustrine	L2AB-LACUSTRINE, LITTORAL, AQUA BED
L2AB1	Lacustrine	Algal, Aquatic Bed, Littoral, Lacustrine	L2AB1-LACUSTRINE, LITTORAL, AQUA BED, ALGAL
L2AB2	Lacustrine	Aquatic Moss, Aquatic Bed, Littoral, Lacustrine	L2AB2-LACUSTRINE, LITTORAL, AQUA BED, AQUA MOS
L2AB3	Lacustrine	Rooted Vascular, Aquatic Bed, Littoral, Lacustrine	L2AB3-LACUSTRINE, LITTORAL, AQUA BED, ROOT VAS
L2AB4	Lacustrine	Floating Vascular, Aquatic Bed, Littoral, Lacustrine	L2AB4-LACUSTRINE, LITTORAL, AQUA BED, FLOT VAS
L2AB5	Lacustrine	Unknown Submergent, Aquatic Bed, Littoral, Lacustrine	L2AB5-LACUSTRINE, LITTORAL, AQUA BED, UNK SUB

Definition Guide

L2AB6	Lacustrine	Unknown Surface, Aquatic Bed, Littoral, Lacustrine	L2AB6-LACUSTRINE, LITTORAL, AQUA BED, UNK SURF
L2EM	Lacustrine	Emergent, Littoral, Lacustrine	L2EM-LACUSTRINE, LITTORAL, EMERGENT
L2EM2	Lacustrine	Nonpersistent, Emergent, Littoral, Lacustrine	L2EM2-LACUSTRINE, LITTORAL, EMERGENT, NONPERS
L2OW	Lacustrine	Open Water/Unknown Bottom, Littoral, Lacustrine	L2OW-LACUSTRINE, LITTORAL, OPEN WATER
L2RB	Lacustrine	Rock Bottom, Littoral, Lacustrine	L2RB-LACUSTRINE, LITTORAL, ROCK BOTTOM
L2RB1	Lacustrine	Bedrock, Rock Bottom, Littoral, Lacustrine	L2RB1-LACUSTRINE, LITTORAL, ROCK BOT, BEDROCK
L2RB2	Lacustrine	Rubble, Rock Bottom, Littoral, Lacustrine	L2RB2-LACUSTRINE, LITTORAL, ROCK BOT, RUBBLE
L2RS	Lacustrine	Rocky Shore, Littoral, Lacustrine	L2RS-LACUSTRINE, LITTORAL, ROCKY SHORE
L2RS1	Lacustrine	Bedrock, Rocky Shore, Littoral, Lacustrine	L2RS1-LACUSTRINE, LITTORAL, ROCKY SHR, BEDROCK
L2RS2	Lacustrine	Rubble, Rocky Shore, Littoral, Lacustrine	L2RS2-LACUSTRINE, LITTORAL, ROCKY SHR, RUBBLE
L2UB	Lacustrine	Unconsolidated Bottom, Littoral, Lacustrine	L2UB-LACUSTRINE, LITTORAL, UNCONSOL BOT
L2UB1	Lacustrine	Cobble-Gravel, Unconsolidated Bottom, Littoral, Lacustrine	L2UB1-LACUSTRINE, LITTORAL, UNCONSOL BOT, COBBLE
L2UB2	Lacustrine	Sand, Unconsolidated Bottom, Littoral, Lacustrine	L2UB2-LACUSTRINE, LITTORAL, UNCONSOL BOT, SAND
L2UB3	Lacustrine	Mud, Unconsolidated Bottom, Littoral, Lacustrine	L2UB3-LACUSTRINE, LITTORAL, UNCONSOL BOT, MUD
L2UB4	Lacustrine	Organic, Unconsolidated Bottom, Littoral, Lacustrine	L2UB4-LACUSTRINE, LITTORAL, UNCONSOL BOT, ORGAN
L2US	Lacustrine	Unconsolidated Shore, Littoral, Lacustrine	L2US-LACUSTRINE, LITTORAL, UNCONSOL SHORE
L2US1	Lacustrine	Cobble-Gravel, Unconsolidated Shore, Littoral, Lacustrine	L2US1-LACUSTRINE, LITTORAL, UNCONSOL SHR, COBBLE
L2US2	Lacustrine	Sand, Unconsolidated Shore, Littoral, Lacustrine	L2US2-LACUSTRINE, LITTORAL, UNCONSOL SHR, SAND
L2US3	Lacustrine	Mud, Unconsolidated Shore, Littoral, Lacustrine	L2US3-LACUSTRINE, LITTORAL, UNCONSOL SHR, MUD
L2US4	Lacustrine	Organic, Unconsolidated Shore, Littoral, Lacustrine	L2US4-LACUSTRINE, LITTORAL, UNCONSOL SHR, ORGAN
L2US5	Lacustrine	Vegetated, Unconsolidated Shore, Littoral, Lacustrine	L2US5-LACUSTRINE, LITTORAL, UNCONSOL SHR, VEGET
M	Marine	Marine - Consists of the open ocean overlying the continental shelf and its associated high-energy coastline. Mar	M-MARINE
M1	Marine	Subtidal Marine	M1-MARINE, SUBTIDAL
M1AB	Marine	Aquatic Bed, Subtidal, Marine	M1AB-MARINE, SUBTIDAL, AQUATIC BED
M1AB1	Marine	Algal, Aquatic Bed, Subtidal, Marine	M1AB1-MARINE, SUBTIDAL, AQUATIC BED, ALGAL
M1AB3	Marine	Rooted Vascular, Aquatic Bed, Subtidal, Marine	M1AB3-MARINE, SUBTIDAL, AQUATIC BED, ROOT VASC
M1AB5	Marine	Unknown Submergent, Aquatic Bed, Subtidal, Marine	M1AB5-MARINE, SUBTIDAL, AQUATIC BED, UNK SUB
M1OW	Marine	Open Water, Subtidal, Marine (Used on older maps)	M1OW-MARINE, SUBTIDAL, OPEN WATER
M1RB	Marine	Rock Bottom Subtidal Marine	M1RB-MARINE, SUBTIDAL, ROCK BOTTOM
M1RB1	Marine	Bedrock, Rock Bottom, Subtidal, Marine	M1RB1-MARINE, SUBTIDAL, ROCK BOTTOM, BEDROCK
M1RB2	Marine	Rubble, Rock Bottom, Subdtidal, Marine	M1RB2-MARINE, SUBTIDAL, ROCK BOTTOM, RUBBLE
M1RF	Marine	Nonpersistent, Emergent, Lower Perennial, Riverine	M1RF-MARINE, SUBTIDAL, REEF
M1RF1	Marine	Coral, Reef, Subtidal, Marine	M1RF1-MARINE, SUBTIDAL, REEF, CORAL
M1RF3	Marine	Worm, Reef, Subtidal, Marine	M1RF3-MARINE, SUBTIDAL, REEF, WORM
M1UB	Marine	Unconsolidated Bottom, Subtidal, Marine	M1UB-MARINE, SUBTIDAL, UNCONSOLIDATED BOTTOM
M1UB1	Marine	Cobble-Gravel, Unconsolidated, Subtidal, Marine	M1UB1-MARINE, SUBTIDAL, UNCONSOL BOTTOM, COBBL
M1UB2	Marine	Sand, Unconsolidated Bottom, Subtidal, Marine	M1UB2-MARINE, SUBTIDAL, UNCONSOL BOTTOM, SAND
M1UB3	Marine	Mud, Unconsolidated Bottom, Subtidal, Marine	M1UB3-MARINE, SUBTIDAL, UNCONSOL BOTTOM, MUD
M1UB4	Marine	Organic, Unconsolidated Bottom, Subtidal, Marine	M1UB4-MARINE, SUBTIDAL, UNCONSOL BOTTOM, ORGAN
M2	Marine	Intertidal, Marine	M2-MARINE, INTERTIDAL
M2AB	Marine	Aquatic Bed, Intertidal, Marine	M2AB-MARINE, INTERTIDAL, AQUATIC BED
M2AB1	Marine	Algal, Aquatic Bed, Intertidal, Marine	M2AB1-MARINE, INTERTIDAL, AQUATIC BED, ALGAL
M2AB3	Marine	Rooted Vascular, Aquatic Bed, Intertidal, Marine	M2AB3-MARINE, INTERTIDAL, AQUAT BED, ROOT VASC
M2AB5	Marine	Unknown Submergent, Aquatic Bed, Intertidal, Marine	M2AB5-MARINE, INTERTIDAL, AQUATIC BED, UNK SUB
M2RF	Marine	Reef, Intertidal, Marine	M2RF-MARINE, INTERTIDAL, REEF
M2RF1	Marine	Coral, Reef, Intertidal, Marine	M2RF1-MARINE, INTERTIDAL, REEF, CORAL
M2RF3	Marine	Worm, Reef, Intertidal, Marine	M2RF3-MARINE, INTERTIDAL, REEF, WORM
M2RS	Marine	Rocky Shore, Intertidal, Marine	M2RS-MARINE, INTERTIDAL, ROCKY SHORE
M2RS1	Marine	Bedrock, Rocky Shore, Intertidal, Marine	M2RS1-MARINE, INTERTIDAL, ROCKY SHORE, BEDROCK
M2RS2	Marine	Rubble, Rocky Shore, Intertidal, Marine	M2RS2-MARINE, INTERTIDAL, ROCKY SHORE, RUBBLE
M2US	Marine	Unconsolidated Shore, Intertidal, Marine	M2US-MARINE, INTERTIDAL, UNCONSOLIDATED SHORE
M2US1	Marine	Cobble-Gravel, Unconsolidated Shore, Intertidal, Marine	M2US1-MARINE, INTERTIDAL, UNCONSOL SHORE, COBB
M2US2	Marine	Sand, Unconsolidated Shore, Intertidal, Marine	M2US2-MARINE, INTERTIDAL, UNCONSOL SHORE, SAND
M2US3	Marine	Mud, Unconsolidated Shore, Intertidal, Marine	M2US3-MARINE, INTERTIDAL, UNCONSOL SHORE, MUD
M2US4	Marine	Organic, Unconsolidated Shore, Intertidal, Marine	M2US4-MARINE, INTERTIDAL, UNCONSOL SHORE, ORG
P	Palustrine	Palustrine - Includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or	P-PALUSTRINE
PAB	Palustrine	Aquatic Bed, Palustrine	PAB-PALUSTRINE, AQUA BED
PAB1	Palustrine	Algal, Aquatic Bed, Palustrine	PAB1-PALUSTRINE, AQUA BED, ALGAL
PAB2	Palustrine	Aquatic Moss, Aquatic Bed, Palustrine	PAB2-PALUSTRINE, AQUA BED, AQUATIC MOSS
PAB3	Palustrine	Rooted Vascular, Aquatic Bed, Palustrine	PAB3-PALUSTRINE, AQUA BED, ROOTED VASC
PAB4	Palustrine	Floating Vascular, Aquatic Bed, Palustrine	PAB4-PALUSTRINE, AQUA BED, FLOAT VASC
PAB5	Palustrine	Unknown Submergent, Aquatic Bed, Palustrine	PAB5-PALUSTRINE, AQUA BED, UNK SUB
PAB6	Palustrine	Unknown Surface, Aquatic Bed, Palustrine	PAB6-PALUSTRINE, AQUA BED, UNK SURF
PEM	Palustrine	Emergent, Palustrine	PEM-PALUSTRINE, EMERGENT
PEM1	Palustrine	Persistent, Emergent, Palustrine	PEM1-PALUSTRINE, EMERGENT, PERSISTENT
PEM2	Palustrine	Nonpersistent, Emergent, Palustrine	PEM2-PALUSTRINE, EMERGENT, NONPERSISTENT
PFO	Palustrine	Forested, Palustrine	PFO-PALUSTRINE, FORESTED
PFO1	Palustrine	Broad-Leaved Deciduous, Forested, Palustrine	PFO1-PALUSTRINE, FORESTED, BLD
PFO2	Palustrine	Needle-Leaved Deciduous, Forested, Palustrine	PFO2-PALUSTRINE, FORESTED, NLE
PFO3	Palustrine	Broad-Leaved Evergreen, Forested, Palustrine	PFO3-PALUSTRINE, FORESTED, BLE
PFO4	Palustrine	Needle-Leaved Evergreen, Forested, Palustrine	PFO4-PALUSTRINE, FORESTED, NLE
PFO5	Palustrine	Dead, Forested, Palustrine	PFO5-PALUSTRINE, FORESTED, DEAD
PFO6	Palustrine	Indeterminate Deciduous, Forested, Palustrine	PFO6-PALUSTRINE, FORESTED, INDET DEC
PFO7	Palustrine	Indeterminate Evergreen, Forested, Palustrine	PFO7-PALUSTRINE, FORESTED, INDETER EVER
PML	Palustrine	Moss-Lichens, Palustrine	PML-PALUSTRINE, MOSS-LICHENS
PML1	Palustrine	Moss, Moss-Lichens, Palustrine	PML1-PALUSTRINE, MOSS-LICHENS, MOSS
PML2	Palustrine	Lichen, Moss-Lichen, Palustrine	PML2-PALUSTRINE, MOSS-LICHEN, LICHEN
POW	Palustrine	POW-PALUSTRINE, OPEN WATER	POW-PALUSTRINE, OPEN WATER
PRB	Palustrine	Rock Bottom, Palustrine	PRB-PALUSTRINE, ROCK BOTTOM
PRB1	Palustrine	Bedrock, Rock Bottom, Palustrine	PRB1-PALUSTRINE, ROCK BOTTOM, BEDROCK
PRB2	Palustrine	Rubble, Rock Bottom, Palustrine	PRB2-PALUSTRINE, ROCK BOTTOM, RUBBLE
PSS	Palustrine	Scrub-Shrub, Palustrine	PSS-PALUSTRINE, SCRUB-SHRUB
PSS1	Palustrine	Broad-Leaved Deciduous, Scrub-Shrub, Palustrine	PSS1-PALUSTRINE, SCRUB-SHRUM, BLD
PSS2	Palustrine	Needle-Leaved Deciduous, Scrub-Shrub, Palustrine	PSS2-PALUSTRINE, SCRUB-SHRUB, NLD
PSS3	Palustrine	Broad-Leaved Evergreen, Scrub-Shrub, Palustrine	PSS3-PALUSTRINE, SCRUB-SHRUB, BLE
PSS4	Palustrine	Needle-Leaved Evergreen, Scrub-Shrub, Palustrine	PSS4-PALUSTRINE, SCRUB-SHRUB, NLE
PSS5	Palustrine	Dead, Scrub-Shrub	PSS5-PALUSTRINE, SCRUB-SHRUB, DEAD
PSS6	Palustrine	Indeterminate Deciduous, Scrub-Shrub, Palustrine	PSS6-PALUSTRINE, SCRUB-SHRUB, INDET DEC
PSS7	Palustrine	Indeterminate Evergreen, Scrub-Shrub, Palustrine	PSS7-PALUSTRINE, SCRUB-SHRUB, INDET EVER
PUB	Palustrine	Unconsolidated Bottom, Palustrine	PUB-PALUSTRINE, UNCONSOL BOT
PUB1	Palustrine	Cobble-Gravel, Unconsolidated Bottom, Palustrine	PUB1-PALUSTRINE, UNCONSOL BOT, COBBLE
PUB2	Palustrine	Sand, Unconsolidated Bottom, Palustrine	PUB2-PALUSTRINE, UNCONSOL BOT, SAND
PUB3	Palustrine	Mud, Unconsolidated Bottom, Palustrine	PUB3-PALUSTRINE, UNCONSOL BOT, MUD
PUB4	Palustrine	Organic, Unconsolidated Bottom, Palustrine	PUB4-PALUSTRINE, UNCONSOL BOT, ORGANIC
RP	Riparian	Riparian - Plant communities contiguous to and affected by surface and subsurface hydrologic features of perenni	RP-RIPARIAN
RP1	Riparian	Lotic, Riparian	RP1-RIPARIAN, LOTIC
RP1EM	Riparian	Emergent, Lotic, Riparian	RP1EM-RIPARIAN, LOTIC, EMERGENT
RP1FO	Riparian	Forested, Lotic, Riparian	RP1FO-RIPARIAN, LOTIC, FORESTED
RP1FO6	Riparian	Decidous, Forested, Lotic, Riparian	RP1FO6-RIPARIAN, LOTIC, FORESTED, DECIDOUS
RP1FO7	Riparian	Evergreen, Forested, Lotic, Riparian	RP1FO7-RIPARIAN, LOTIC, FORESTED, EVERGREEN
RP1FO8	Riparian	Mixed, Forested, Lotic, Riparian	RP1FO8-RIPARIAN, LOTIC, FORESTED, MIXED
RP1SS	Riparian	Scrub-Shrub, Lotic, Riparian	RP1SS-RIPARIAN, LOTIC, SCRUB-SHRUB
RP1SS6	Riparian	Decidous, Scrub-Shrub, Lotic, Riparian	RP1SS6-RIPARIAN, LOTIC, SCRUB-SHRUB, DECIDOUS
RP1SS7	Riparian	Evergreen, Scrub-Shrub, Lotic, Riparian	RP1SS7-RIPARIAN, LOTIC, SCRUB-SHRUB, EVERGREEN
RP1SS8	Riparian	Mixed, Scrub-Shrub, Lotic, Riparian	RP1SS8-RIPARIAN, LOTIC, SCRUB-SHRUB, MIXED
RP2	Riparian	Lentic, Riparian	RP2-RIPARIAN, LENTIC
RP2EM	Riparian	Emergent, Lentic, Riparian	RP2EM-RIPARIAN, LENTIC, EMERGENT
RP2FO	Riparian	Forested, Lentic. Riparian	RP2FO-RIPARIAN, LENTIC, FORESTED
RP2FO6	Riparian	Decidous, Forested, Lentic, Riparian	RP2FO6-RIPARIAN, LENTIC. FORESTED, DECIDOUS
RP2FO7	Riparian	Evergreen, Forested, Lentic, Riparian	RP2FO7-RIPARIAN, LENTIC, FORESTED, EVERGREEN

Definition Guide

RP2FO8	Riparian	Mixed, Forested, Lentic, Riparian	RP2FO8-RIPARIAN, LENTIC, FORESTED, MIXED
RP2SS	Riparian	Scrub-Shrub, Lentic, Riparian	RP2SS-RIPARIAN, LENTIC, SCRUB-SHRUB
RP2SS6	Riparian	Decidous, Scrub-Shrub, Lentic, Riparian	RP2SS6-RIPARIAN, LENTIC, SCRUB-SHRUB, DECIDOUS
RP2SS7	Riparian	Evergreen, Scrub-Shrub, Lentic, Riparian	RP2SS7-RIPARIAN, LENTIC, SCRUB-SHRUB, EVERGREEN
RP2SS8	Riparian	Mixed, Scrub-Shrub, Lentic, Riparian	RP2SS8-RIPARIAN, LENTIC, SCRUB-SHRUB, MIXED
R	Riverine	Riverine - Includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlar	R-RIVERINE
R1	Riverine	Tidal, Riverine	R1-RIVERINE, TIDAL
R1AB	Riverine	Aquatic Bed, Tidal, Riverine	R1AB-RIVERINE, TIDAL, AQUATIC BED
R1AB1	Riverine	Algal, Aquatic Bed, Tidal, Riverine	R1AB1-RIVERINE,TIDAL, AQUATIC BED, ALGAL
R1AB2	Riverine	Aquatic Moss, Aquatic Bed, Tidal, Riverine	R1AB2-RIVERINE, TIDAL, AQUA BED, MOSS
R1AB3	Riverine	Rooted Vascular, Aquatic Bed, Tidal, Riverine	R1AB3-RIVERINE, TIDAL, AQUA BED, ROOTED VASC
R1AB4	Riverine	Floating Vascular, Aquatic Bed, Tidal, Riverine	R1AB4-RIVERINE, TIDAL, AQUA BED, FLOATING VASC
R1AB5	Riverine	Unknown Submergent, Aquatic Bed, Tidal, Riverine	R1AB5-RIVERINE, TIDAL, AQUA BED, UNK SUBMERGEN
R1AB6	Riverine	Unknown Surface, Aquatic Bed, Tidal, Riverine	R1AB6-RIVERINE, TIDAL, AQUA BED, UNK SURFACE
R1EM	Riverine	Emergent, Tidal, Riverine	R1EM-RIVERINE, TIDAL, EMERGENT
R1EM2	Riverine	Nonpersistent, Emergent, Tidal, Riverine	R1EM2-RIVERINE, TIDAL, EMERGENT, NONPERSISTENT
R1RB	Riverine	Rock Bottom, Tidal, Riverine	R1RB-RIVERINE, TIDAL, ROCK BOTTOM
R1RB1	Riverine	Bedrock, Rock Bottom, Tidal, Riverine	R1RB1-RIVERINE, TIDAL, ROCK BOTTOM, BEDROCK
R1RB2	Riverine	Rubble, Rock Bottom, Tidal, Riverine	R1RB2-RIVERINE, TIDAL, ROCK BOTTOM, RUBBLE
R1RS	Riverine	Rocky Shore, Tidal, Riverine	R1RS-RIVERINE, TIDAL, ROCKY SHORE
R1RS1	Riverine	Bedrock, Rocky Shore, Tidal, Riverine	R1RS1-RIVERINE, TIDAL, ROCKY SHORE, BEDROCK
R1RS2	Riverine	Rubble, Rocky Shore, Tidal, Riverine	R1RS2-RIVERINE, TIDAL, ROCKY SHORE, RUBBLE
R1SB	Riverine	Streambed, Tidal, Riverine	R1SB-RIVERINE, TIDAL, STREAMBED
R1SB1	Riverine	Bedrock. Streambed, Tidal, Riverine	R1SB1-RIVERINE, TIDAL, STREAMBED, BEDROCK
R1SB2	Riverine	Rubble, Streambed, Ridal, Riverine	R1SB2-RIVERINE, TIDAL, STREAMBED, RUBBLE
R1SB3	Riverine	Cobble-Gravel, Streambed, Tidal, Riverine	R1SB3-RIVERINE, TIDAL, STREAMBED, COBBLE
R1SB4	Riverine	Sand, Streambed, Tidal, Riverine	R1SB4-RIVERINE, TIDAL, STREAMBED, SAND
R1SB5	Riverine	Mud, Streambed, Tidal, Riverine	R1SB5-RIVERINE, TIDAL, STREAMBED, MUD
R1SB6	Riverine	Organic, Streambed, Tidal, Riverine	R1SB6-RIVERINE, TIDAL, STREAMBED, ORGANIC
R1SB7	Riverine	Vegetated, Streambed, Tidal, Riverine	R1SB7-RIVERINE, TIDAL, STREAMBED, VEGETATED
R1UB	Riverine	Unconsolidated Bottom, Tidal, Riverine	R1UB-RIVERINE, TIDAL, UNCONSOLIDATED BOTTOM
R1UB1	Riverine	Cobble-Gravel, Unconsolidated Bottom, Tidal, Riverine	R1UB1-RIVERINE, TIDAL, UNCONSOL BOTTOM, COBBLE
R1UB2	Riverine	Sand, Unconsolidated Bottom, Tidal, Riverine	R1UB2-RIVERINE, TIDAL, UNCONSOL BOTTOM, SAND
R1UB3	Riverine	Mud, Unconsolidated Bottom, Tidal, Riverine	R1UB3-RIVERINE, TIDAL, UNCONSOL BOTTOM, MUD
R1UB4	Riverine	Organic, Unconsolidated Bottom, Tidal, Riverine	R1UB4-RIVERINE, TIDAL, UNCONSOL BOTTOM, ORGAN
R1US	Riverine	Unconsolidated Shore, Tidal, Riverine	R1US-RIVERINE, TIDAL, UNCONSOL SHORE
R1US1	Riverine	Cobble-Gravel, Unconsolidated Shore, Tidal, Riverine	R1US1-RIVERINE, TIDAL, UNCONSOL SHORE, COBBLE
R1US2	Riverine	Sand, Unconsolidated Shore, Tidal, Riverine	R1US2-RIVERINE, TIDAL, UNCONSOL SHORE, SAND
R1US3	Riverine	Mud, Unconsolidated Shore, Tidal, Riverine	R1US3-RIVERINE, TIDAL, UNCONSOL SHORE, MUD
R1US4	Riverine	Organic, Unconsolidated Shore, Tidal, Riverine	R1US4-RIVERINE, TIDAL, UNCONSOL SHORE, ORGANIC
R1US5	Riverine	Vegetated, Unconsolidated Shore, Tidal, Riverine	R1US5-RIVERINE, TIDAL, UNCONSOL SHORE, VEGETAT
R2	Riverine	Lower Perennial, Riverine	R2-RIVERINE, LOWER PERENNIAL
R2AB	Riverine	Aquatic Bed, Lower Tidal, Riverine	R2AB-RIVERINE, LOWER PEREN, AQUA BED
R2AB1	Riverine	Algal, Aquatic Bed, Lower Tidal, Riverine	R2AB1-RIVERINE, LOWER PEREN, AQUA BED, ALGAL
R2AB2	Riverine	Aquatic Moss, Aquatic Bed, Lower Tidal, Riverine	R2AB2-RIVERINE, LOWER PEREN, AQUA BED, AQ MOSS
R2AB3	Riverine	Rooted Vascular, Aquatic Bed, Lower Tidal, Riverine	R2AB3-RIVERINE, LOWER PEREN, AQUA BED, ROOT VASC
R2AB4	Riverine	Floating Vascular, Aquatic Bed, Lower Tidal, Riverine	R2AB4-RIVERINE, LOWER PEREN, AQUA BED, FLOAT VAS
R2AB5	Riverine	Unknown Submergent, Aquatic Bed, Lower Tidal, Riverine	R2AB5-RIVERINE, LOWER PEREN, AQUA BED, UNK SUB
R2AB6	Riverine	Unknown Surface, Aquatic Bed, Lower Tidal, Riverine	R2AB6-RIVERINE, LOWER PEREN, AQUA BED, UNK SURF
R2EM	Riverine	Emergent, Lower Tidal, Riverine	R2EM-RIVERINE, LOWER PEREN, EMERGENT
R2EM2	Riverine	Nonpersistent, Emergent, Lower Tidal, Riverine	R2EM2-RIVERINE, LOWER PEREN, EMERGENT, NONPERS
R2RB	Riverine	Rock Bottom, Lower Perennial, Riverine	R2RB-RIVERINE, LOWER PEREN, ROCK BOTTOM
R2RB1	Riverine	Bedrock, Rock Bottom, Lower Perennial, Riverine	R2RB1-RIVERINE, LOWER PEREN, ROCK BOT, BEDROCK
R2RB2	Riverine	Rubble, Rock Bottom, Lower Perennial, Riverine	R2RB2-RIVERINE, LOWER PEREN, TOCK BOT, RUBBLE
R2RS	Riverine	Rocky Shore, Lower Tidal, Riverine	R2RS-RIVERINE, LOWER PEREN, ROCKY SHORE
R2RS1	Riverine	Bedrock, Rocky Shore, Lower Tidal, Riverine	R2RS1-RIVERINE, LOWER PEREN, ROCKY SHORE, BEDRK
R2RS2	Riverine	Rubble, Rocky Shore, Lower Tidal, Riverine	R2RS2-RIVERINE, LOWER PEREN, ROCKY SHORE, RUBBL
R2UB	Riverine	Unconcolidated Bottom, Lower Perennial, Riverine	R2UB-RIVERINE, LOWER PEREN, UNCONSOL BOT
R2UB1	Riverine	Cobble-Gravel, Unconsolidated Bottom, Lower Perennial, Riverine	R2UB1-RIVERINE, LOWER PEREN, UNCONSOL BOT, COB
R2UB2	Riverine	Sand, Unconsolidated Bottom, Lower Perennial, Riverine	R2UB2-RIVERINE, LOWER PEREN, UNCONSOL BOT, SAN
R2UB3	Riverine	Mud, Unconsolidated Bottom, Lower Perennial, Riverine	R2UB3-RIVERINE, LOWER PEREN, UNCONSOL BOT, MUD
R2UB4	Riverine	Organic, Unconsolidated Bottom, Lower Perennial, Riverine	R2UB4-RIVERINE, LOWER PEREN, UNCONSOL BOT, ORG
R2US	Riverine	Unconsolidated Shore, Lower Tidal, Riverine	R2US-RIVERINE, LOWER PEREN, UNCONSOL SHORE
R2US1	Riverine	Cobble-Gravel, Unconsolidated Shore, Lower Tidal, Riverine	R2US1-RIVERINE, LOWER PEREN, UNCONSOL SHR, COB
R2US2	Riverine	Sand, Unconsolidated Shore, Lower Tidal, Riverine	R2US2-RIVERINE, LOWER PEREN, UNCONSOL SHR, SAN
R2US3	Riverine	Rooted Vascular, Unconsolidaated Shore, Lower Tidal, Riverine	R2US3-RIVERINE, LOWER PEREN, UNCONSOL SHR, RV
R2US4	Riverine	Floating Vascular, Unconsolidated Shore, Lower Tidal, Riverine	R2US4-RIVERINE, LOWER PEREN, UNCONSOL SHR, FV
R2US5	Riverine	Unknown Submergent, Unconsolidated Shore, Lower Tidal, Riverine	R2US5-RIVERINE, LOWER PEREN, UNCONSOL SHR, UN SUB
R2US6	Riverine	Unknown Surface, Unknown Surface, Lower Tidal, Riverine	R2US6-RIVERINE, LOWER PEREN, UNCONSOL SHR, UNK SUR
R3	Riverine	Upper Perennial, Riverine	R3-RIVERINE, UPPER PERENNIAL
R3AB	Riverine	Aquatic Bed, Upper Perennial, Riverine	R3AB-RIVERINE, UPPER PEREN, AQUA BED
R3AB1	Riverine	Algal, Aquatic Bed, Upper Perennial, Riverine	R3AB1-RIVERINE, UPPER PEREN, AQUA BED, ALGAL
R3AB2	Riverine	Aquatic Moss, Aquatic Bed, Upper Perennial, Riverine	R3AB2-RIVERINE, UPPER PEREN, AQUA BED, AQUA MOSS
R3AB3	Riverine	Rooted Vascular, Aquatic Bed, Upper Perennial, Riverine	R3AB3-RIVERINE, UPPER PEREN, AQUA BED, ROOT VAS
R3AB4	Riverine	Floating Vascular, Aquatic Bed, Upper Perennial, Riverine	R3AB4-RIVERINE, UPPER PEREN, AQUA BED, FLOAT VAS
R3AB5	Riverine	Unknown Submergent, Aquatic Bed, Upper Perennial, Riverine	R3AB5-RIVERINE, UPPER PEREN, AQUA BED, UNK SUB
R3AB6	Riverine	Unknown Surface, Aquatic Bed, Upper Perennial, Riverine	R3AB6-RIVERINE, UPPER PEREN, AQUA BED, UNK SURF
R3RB	Riverine	Rock Bottom, Upper Perennial, Riverine	R3RB-RIVERINE, UPPER PEREN, ROCK BOTTOM
R3RB1	Riverine	Bedrock, Rock Bottom, Upper Perennial, Riverine	R3RB1-RIVERINE, UPPER PEREN, ROCK BOT, BEDROCK
R3RB2	Riverine	Rubble, Rock Bottom, Upper Perennial, Riverine	R3RB2-RIVERINE, UPPER PEREN, ROCK BOT, RUBBLE
R3RS	Riverine	Rocky Shore, Upper Perennial, Riverine	R3RS-RIVERINE, UPPER PEREN, ROCKY SHORE
R3RS1	Riverine	Bedrock, Rocky Shore, Upper Perennial, Riverine	R3RS1-RIVERINE, UPPER PEREN, ROCKY SHR, BEDROCK
R3RS2	Riverine	Rubble, Rocky Shore, Upper Perennial, Riverine	R3RS2-RIVERINE, UPPER PEREN, ROCKY SHR, RUBBLE
R3UB	Riverine	Unconsolidated Bottom, Upper Perennial, Riverine	R3UB-RIVERINE, UPPER PEREN, UNCONSOL BOT
R3UB1	Riverine	Cobble-Gravel, Unconsolidated Bottom, Upper Perennial, Riverine	R3UB1-RIVERINE, UPPER PEREN, UNCONSOL BOT, COBBLE
R3UB2	Riverine	Sand, Unconsolidated Bottom, Upper Perennial, Riverine	R3UB2-RIVERINE, UPPER PEREN, UNCONSOL BOT, SAND
R3UB3	Riverine	Mud, Unconsolidated Bottom, Upper Perennial, Riverine	R3UB3-RIVERINE, UPPER PEREN, UNCONSOL BOT, MUD
R3UB4	Riverine	Organic, Unconsolidated Bottom, Upper Perennial, Riverine	R3UB4-RIVERINE, UPPER PEREN, UNCONSOL BOT, ORGAN
R3US	Riverine	Unconsolidated Shore, Upper Perennial, Riverine	R3US-RIVERINE, UPPER PEREN, UNCONSOL SHR
R3US1	Riverine	Cobble-Gravel, Unconsolidated Shore, Upper Perennial, Riverine	R3US1-RIVERINE, UPPER PEREN, UNCONSOL SHR, COBBLE
R3US2	Riverine	Sand, Unconsolidated Shore, Upper Perennial, Riverine	R3US2-RIVERINE, UPPER PEREN, UNCONSOL SHR, SAND
R3US3	Riverine	Mud, Unconsolidated Shore, Upper Perennial, Riverine	R3US3-RIVERINE, UPPER PEREN, UNCONSOL SHR, MUD
R3US4	Riverine	Organic, Unconsolidated Shore, Upper Perennial, Riverine	R3US4-RIVERINE, UPPER PEREN, UNCONSOL SHR, ORGANIC
R3US5	Riverine	Vegetated, Unconsolidated Shore, Upper Perennial, Riverine	R3US5-RIVERINE, UPPER PEREN, UNCONSOL SHR, VEGETATED
R4	Riverine	Intermittent, Riverine	R4-RIVERINE, INTERMIT
R4SB	Riverine	Streambed, Intermittent, Riverine	R4SB-RIVERINE, INTERMIT, STREAMBED
R4SB1	Riverine	Bedrock, Streambed, Intermittent, Riverine	R4SB1-RIVERINE, INTERMIT, STREAMBED, BEDROCK
R4SB2	Riverine	Rubble, Streambed, Intermittent, Riverine	R4SB2-RIVERINE, INTERMIT, STREAMBED, RUBBLE
R4SB3	Riverine	Cobble-Gravel, Streambed, Intermittent, Riverine	R4SB3-RIVERINE, INTERMIT, STREAMBED, COBBLE
R4SB4	Riverine	Sand, Streambed, Intermittent, Riverine	R4SB4-RIVERINE, INTERMIT, STREAMBED, SAND
R4SB5	Riverine	Mud, Streambed, Intermittent, Riverine	R4SB5-RIVERINE, INTERMIT, STREAMBED, MUD
R4SB6	Riverine	Organic, Streambed, Intermittent, Riverine	R4SB6-RIVERINE, INTERMIT, STREAMBED, ORGANIC
R4SB7	Riverine	Vegetated, Streambed, Intermittent, Riverine	R4SB7-RIVERINE, INTERMIT, STREAMBED, VEGETATED
R5	Riverine	Unknown Perennial, Riverine	R5-RIVERINE, UNKNOWN PERENNIAL
R5AB	Riverine	Aquatic Bed, Unknown Perennial, Riverine	R5AB-RIVERINE, UNK PEREN, AQUA BED
R5AB1	Riverine	Algal, Aquatic Bed, Unknown Perennial, Riverine	R5AB1-RIVERINE, UNK PEREN, AQUA BED, ALGAL
R5AB2	Riverine	Aquatic Moss, Aquatic Bed, Unknown Perennial, Riverine	R5AB2-RIVERINE, UNK PEREN, AQUA BED, AQUA MOSS
R5AB3	Riverine	Rooted Vascular, Aquatic Bed, Unknown Perennial, Riverine	R5AB3-RIVERINE, UNK PEREN, AQUA BED, ROOT VASC
R5AB4	Riverine	Floating Vascular, Aquatic Bed, Unknown Perennial, Riverine	R5AB4-RIVERINE, UNK PEREN, AQUA BED, FLOAT VASC
R5AB5	Riverine	Unknown Submergent, Aquatic Bed, Unknown Perennial, Riverine	R5AB5-RIVERINE, UNK PEREN, AQUA BED, UNK SUB

Definition Guide

R5AB6	Riverine	Unknown Surface, Aquatic Bed, Unknown Perennial, Riverine	R5AB6-RIVERINE, UNK PEREN, AQUA BED, UNK SURF
R5RB	Riverine	Rock Bottom, Unknown Perennial, Riverine	R5RB-RIVERINE, UNK PEREN, ROCK BOTTOM
R5RB1	Riverine	Bedrock, Rock Bottom Unknown Perennial, Riverine	R5RB1-RIVERINE, UNK PEREN, ROCK BOTTOM, BEDROCK
R5RB2	Riverine	Rubble, Rock Bottom, Unknown Perennial, Riverine	R5RB2-RIVERINE, UNK PEREN, ROCK BOTTOM, RUBBLE
R5RS	Riverine	Rocky Shore, Unknown Perennial, Riverine	R5RS-RIVERINE, UNK PEREN, ROCKY SHORE
R5RS1	Riverine	Bedrock, Rocky Shore, Unknown Perennial, Riverine	R5RS1-RIVERINE, UNK PEREN, ROCKY SHORE, BEDROCK
R5RS2	Riverine	Rubble, Rocky Shore, Unknown Perennial, Riverine	R5RS2-RIVERINE, UNK PEREN, ROCKY SHORE, RUBBLE
R5UB	Riverine	Unconsolidated Bottom, Unknown Perennial, Riverine	R5UB-RIVERINE, UNK PEREN, UNCONSOLIDATED BOTTOM
R5UB1	Riverine	Cobble-Gravel, Unconsolidated Bottom, Unknown Perennial, Riverine	R5UB1-RIVERINE, UNK PEREN, UNCONSOL BOT, COBBLE
R5UB2	Riverine	Sand, Unconsolidated Bottom, Unknown Perennial, Riverine	R5UB2-RIVERINE, UNK PEREN, UNCONSOT BOT, SAND
R5UB3	Riverine	Mud, Unconsolidated Bottom, Unknown Perennial, Riverine	R5UB3-RIVERINE, UNK PEREN, UNCONSOL BOT, MUD
R5UB4	Riverine	Organic, Unconsolidated Bottom, Unknow Perennial, Riverine	R5UB4-RIVERINE, UNK PEREN, UNCONSOL BOT, ORGANIC
R5US	Riverine	Unconsolidated Shore, Unknown Perennial, Riverine	R5US-RIVERINE, UNK PEREN, UNCONCOL SHORE
R5US1	Riverine	Cobble-Gravel, Unconsolidated Shore, Riverine	R5US1-RIVERINE, UNK PEREN, UNCONSOL SHR, COBBLE
R5US2	Riverine	Sand, Unconsolidated Shore, Unknown Perennial, Riverine	R5US2-RIVERINE, UNK PEREN, UNCONSOL SHR, SAND
R5US3	Riverine	Mud, Unconsolidated Shore, Unknown Perennial, Riverine	R5US3-RIVERINE, UNK PEREN, UNCONSOL SHR, MUD
R5US4	Riverine	Organic, Unconsolidated Shore, Unknown Perennial, Riverine	R5US4-RIVERINE, UNK PEREN, UNCONSOL SHR, ORGANIC
R5US5	Riverine	Vegetated, Unconsolidated Shore, Unknown Perennial, Riverine	R5US5-RIVERINE, UNK PEREN, UNCONSOL SHR, VEGETATED
R6	Riverine	A wetland, spring, stream, river, pond or lake that only exists for a short period	R6 - RIVERINE, EPHEMERAL
U	Uplands	Upland - Not a wetland or deepwater habitat of the United States as described by Cowardin.	U-UPLANDS

Attachment 6 Kinder Morgan Construction Standards: Environmental Requirements

Table of Contents

1. Scope

This document defines the Company standards for Environmental Requirements during construction of all Pipelines, Meter Stations, Compressor Stations and Gas Processing and Treating Facilities. For Projects subject to FERC regulation, additional requirements may apply, and shall supercede the basic requirements contained herein.

2. Permit Compliance

Contractor shall perform all construction work in compliance with applicable permits, authorizations, and clearances. Applicable Federal, State, County, or municipal permits shall supercede the requirements contained in this standard.

The Company shall prepare documentation and submit reports as required for compliance with permits and/or FERC requirements.

The Project Manager may designate in the Scope of Work that the Contractor is responsible for obtaining environmental permits or authorizations. Contractor shall provide copies of all permit applications or authorization requests, prior to submitting to agencies, for review by the Environmental, Safety and Health Department.

3. General Best Management Practices (BMP's)

3.1. All construction activities shall be conducted to minimize adverse environmental impacts. Contractor shall conduct all construction activities in an environmentally-sensitive manner in conformance with this standard and in compliance with applicable Federal, State, or local environmental regulations.

The Contractor shall employ construction methods and preventive measures (in all construction and support areas) to control dust generation, soil erosion, siltation of water bodies and wetlands, and spills of fuels, solvents, or other materials. Contractor shall install, inspect, and maintain said preventative measures required for any construction-related activities. Contractor shall comply with all requirements of this standard, which is the **minimum** performance requirement.

3.2. Contractor shall install control structures at locations along the right-of-way (ROW). Contractor shall select the BMP's that provide compliance with applicable environmental requirements. Typical BMP's include:

- Hay bale berms. Refer to Company Construction Drawings **CST-P-1260-A190.1 – Typical Straw Bale Sediment Barrier Erosion Control** and **CST-P-1260-A190.2 – Typical Straw Bale Sediment Barrier Erosion Control**
- Silt fences. Refer to Company Construction Drawings **CST-P-1260-A180.1 – Typical Silt Fence Sediment Barrier Erosion Control** and **CST-P-1260-A180.2 – Typical Silt Fene Sediment Barrier Erosion Control**

- Temporary slope breakers. Refer to CompanyConstruction Drawings **CST-P-1260-A220.1 – Typical Slope Breaker** and **CST-P-1260-A220.2 – Typical Slope Breaker**.
- Sediment logs/waddles. Refer to Company Drawing (to be developed as needed in future)

3.3. Contractor shall install, inspect, and maintain BMP's in conformance with Manufacturer specifications and in compliance with permits, the Scope of Work, and Construction Drawings. Contractor shall install BMP's immediately after initial soil disturbance, and shall maintain BMP's until restoration is completed or such time as the Company authorizes BMP removal. When identified as necessary (e.g., by an inspection) and until BMP's are replaced or restoration is completed, Contractor shall reinstall or modify BMP's as soon as practicable or as required by conditions of permits.

3.4. Unless determined otherwise by the Company Representative, the following spacing requirements shall apply to temporary and permanent slope and trench breakers as minimum requirements for the ROW:

Slope (%)	Spacing (ft)
5 to 15	300
>15 to 30	200
>30	100

Table C1260 / 3.4 – Right-of-Way Slope %

3.5. Permanent Slope Breakers

Refer to Company Construction Drawings **CST-P-1260-A220.1 – Typical Slope Breaker** and **CST-P-1260-A220.2 – Typical Slope Breaker**.

Unless otherwise directed by the Company Representative, or where an area is residential or normally cultivated, Contractor shall install permanent slope breakers at the same minimum spacing as temporary slope breakers.

3.6. Contractor shall install terraces at the base of all slopes adjacent to water bodies, near boundaries between Company-designated wetlands, and adjacent to disturbed upland areas. Contractor shall also install terraces at locations specified by the Company Representative.

3.7. Temporary Trench Plugs

Refer to Company **Construction Drawing CST-P-1150-A275 – Typical Flowing Waterbody Crossing Open Cut Trenced**.

The Company Representative shall determine requirements for, and spacing of, trench plugs. If not specified, Contractor shall leave hard trench plugs (undisturbed soil) on either side of water body crossings and drain tiles. Topsoil shall not be used for trench plugs.

3.8. Trench Breakers

Refer to Company **Construction Drawing CST-P-1260-A200 – Typical Trench Breaker**.

The Company Representative shall determine requirements for, and spacing of, trench breakers.

3.8.1. Trench breakers shall be installed at the same spacing as, and upslope of, terraces and/or permanent slope breakers.

3.8.2. In agricultural fields and residential areas where slope breakers are not typically required, trench breakers shall be installed at the same spacing as if permanent slope breakers were required.

3.8.3. Trench breakers shall be installed at the base of slopes greater than 5% where the base of the slope is less than 50 feet from a water body or wetland.

3.8.4. Trench breakers shall be installed where needed to avoid draining a water body or wetland (to prevent sediment flow into wetlands).

3.8.5. Trench breakers shall not be constructed of topsoil.

3.9. Revegetation (Temporary)

Disturbed areas shall be re-seeded in conformance with Scope of Work, Construction drawings, ROW line list, or permit requirements.

3.10. Revegetation (Permanent)

Disturbed areas shall be re-seeded in conformance with Scope of Work, Construction drawings, ROW line list or permit requirements.

3.11. Mulch

Refer to Company **Construction Drawing CST-P-1260-A215 – Typical Straw Mulch Erosion Control**.

Mulch shall be applied on all slopes (except in actively-cultivated cropland) prior to, concurrent with, or immediately after seeding where necessary to stabilize the soil surface and to reduce wind and water erosion. Asphalt or asphalt-and-resin emulsions shall be applied in conformance with Manufacturer's recommendations. Mulch shall be applied in conformance with Scope of Work, Construction drawings, ROW line list, or permit requirements.

3.12. Jute Thatching or Bonded Fiber Blankets

Jute thatching or bonded fiber blankets may be installed on water body banks (to stabilize seeded areas and other critical areas where the use of mulch and anchoring tools is impractical). Fabric shall be anchored with pegs or staples per Manufacturer's specifications.

3.13. Sediment Basins

Sediment basins shall be constructed in conformance with Scope of Work, Construction drawings, ROW line list, or permit conditions.

3.14. Contractor shall prevent litter, construction debris and construction chemicals that could be exposed to storm water from becoming a pollutant source in storm water discharges.

4. Access Roads

4.1. Unless otherwise specified, access to the ROW shall be from existing, commonly used public roads. The Company Representative shall review and approve any Contractor arrangements to use private roads or undeveloped public roadways as ROW access roads.

4.2. Contractor shall maintain safe and accessible conditions at all road crossings and access points during construction. Contractor shall remove (by periodic sweeping and scraping) all sediment tracked onto public roads as a requirement of work.

4.3. ROW access points at public road crossings shall be subject to local permit conditions and restrictions. If required by the Company Representative or local permit, Contractor shall install crushed stone access pads on either side of the public road at ROW crossings and/or other access road entrances. In residential or active agricultural areas, such stone access pads shall be placed on synthetic fabric (to facilitate stone removal). Refer to Company **Construction Drawing CST-P-1000-A145 – Typical Temporary Paved Road Access Pad**.

4.4. Temporary access roads and final disposition shall be identified in the Scope of Work, Construction drawings, or ROW line list.

5. Upland Construction Activities

5.1. The nominal construction ROW width shall be limited by ROW agreements with landowners, regulatory certificates, and permit or agency requirements. No access or activities are permitted outside ROW limits, Company-approved access roads, or pre-approved staging and work areas.

5.2. The Company Representative shall approve use of any additional areas that are not identified in the Scope of Work, Construction drawings, ROW line list, or permit conditions.

5.3. Topsoil Segregation

Refer to Company Construction Drawings **CST-P-1260-A250 – Typical Full Topsoil Separation Side Hill Construction**, **CST-P-1260-A255 – Typical Topsoil Separation Trench & Spoilside Method**, **CST-P-1260-A260**, **CST-P-1260-A265 – Typical Topsoil Separation Trench Plus 4' Method**, and **CST-P-1260-A270 – Typical Full Topsoil Separation Side Hill Construction Spoilside Travel Lane**.

Topsoil shall be segregated for linear facilities construction or for temporary use areas in actively-cultivated or rotated croplands and pastures, residential areas, hayfields, and other areas when requested by landowners or jurisdictional agencies. Soil segregation shall be in conformance with Scope of Work, agency requirements, ROW line list, or conditions of permits. Salvaged topsoil and subsoil shall be maintained separately throughout all construction activities. Segregated topsoil shall not be used for padding the pipe.

6. Trenching

6.1. Tile lines encountered during trenching operations shall be protected and repaired after trenching. Refer to Company **Construction Drawing CST-P-1000-A305 – Typical Undercrossing of Tile Drainlines**.

6.2. Contractor shall cover open ends of cut tile to prevent the entrance of dirt or animals. Contractor shall immediately mark damaged tile locations using lath with colored ribbon flagging, or with alternate methods approved by the Company Representative. Lath markers shall not be removed except when tile repair crews reopen and repair tiles. Where necessary (to maintain drainage during construction), a temporary pipe bridge or temporary soft trench plugs shall be installed on both sides of the tile.

6.3. Qualified personnel shall test and repair drain tiles. After trenching, Contractor shall probe all drainage tile systems within the disturbed area to check for damage to the tile system. If damage is noted, locations of damage shall be marked as in previous paragraph 6.2 (above).

6.4. Contractor shall perform permanent drain tile repair or replacement (to original or better condition) as required by the Company Representative, landowner, and all applicable jurisdictional agencies.

6.5. Contractor shall make every effort to limit the amount of construction equipment traveling over repaired areas, especially in wet conditions.

6.6. For new pipelines in areas where drain tiles exist (or are planned), Contractor shall ensure that the depth of cover (over the pipeline) avoids interference with drain tile systems. For adjacent pipeline loops in agricultural areas, Contractor shall install new pipeline with at least the same depth of cover as the existing pipeline(s).

6.7. Contractor shall install trench plugs at all water body crossings and drainage tiles, unless directed otherwise by the Company Representative.

6.8. Trench dewater shall be filtered to prevent silt-laden water being discharged into any wetland or waterbody or in conformance with permit requirements. The filtration system shall be installed on the approved/authorized ROW or within areas approved by the

Company Representative. Refer to Company **Construction Drawing CST-P-1000-A165 – Typical Geotextile Filter Bag for Dewatering**.

7. Water Body Crossings

7.1. Contractor shall install waterbody crossings in conformance with the Scope of Work, Construction drawings, or permit conditions. Any changes in work areas require pre-approval by the Company Representative.

7.2. Until equipment bridges are installed, Contractor shall limit the number of waterbody crossings by heavy equipment to one stream or wetland crossing per piece of equipment. For construction across wetlands or other water bodies, Contractor shall comply with permit conditions.

7.3. Contractor shall limit the use of equipment within streams. Only equipment required to complete water crossings or as specified by permit conditions shall be allowed in-stream.

7.4. General work area requirements:

7.4.1. Contractor shall use equipment bridges to cross waterbodies. Refer to Company Construction Drawings **CST-P-1000-A335 – Typical Waterbody Bridge Rockfill & Flume**, **CST-P-1000-A340 – Typical Portable Waterbody Bridge**, **CST-P-1000-A345**, **CST-P-1000-A350 – Typical Portable Waterbody Bridge with Culvert Support**, and **CST-P-1000-A355 – Typical Flexi-Float Waterbody Bridge**.

7.4.2. Contractor shall only use extra work areas (such as staging areas and additional spoil storage areas) identified in the Scope of Work or Construction drawings as permit conditions allow.

7.4.3. Contractor shall limit vegetation clearing between extra work areas and edges of water bodies to the Company-authorized construction ROW.

7.4.4. Contractor shall limit the size of extra work areas to no more than is necessary for construction of water body crossings.

7.4.5. Company Representative shall approve extra work areas prior to use.

7.4.6. For wetland or stream crossings, Contractor shall have on site at least one spill kit with equipment and supplies capable of containing releases of fuel, oil, or other substances. At a minimum, the spill kit shall contain plastic sheeting, sorbent material, and spill booms.

7.5. General crossing procedures and requirements:

7.5.1. Contractor shall comply with Section 404, Nationwide Permit Program Terms and Conditions (33 CFR Part 330) or as directed by the Company Representative.

7.5.2. Contractor shall maintain flow rates to protect aquatic life and prevent interruption of existing downstream water use.

7.5.3. Concrete coating activities, and/or the storage of hazardous materials, chemicals, fuels, or lubricating oils, is not allowed within 100 feet of any water body or within any designated municipal watershed area (except at locations designated for these purposes by a jurisdictional agency).

7.5.4. Except when site conditions prevent access, Contractor shall refuel all construction equipment at least 100 feet from any water body). If refueling of construction equipment is required within 100 feet of a water body, Contractor shall comply with the project-specific Spill Prevention and Response Procedure.

7.5.5. Contractor shall place all spoil from water body crossings and upland spoil from major water body crossings in the construction ROW at least 10 feet from the water's edge or in extra work areas designated by the Company Representative. Contractor shall install sediment barriers to prevent spoil from flowing into any water body.

7.5.6. Contractor shall design, install, and maintain equipment bridges to withstand and pass the highest flow rate that could be expected to occur while the bridge is in service. Contractor may not use soil to construct or stabilize equipment bridges. Contractor shall construct equipment bridges using one of the following methods as allowed by permit conditions:

- Equipment pads and culvert(s). Refer to Company **Construction Drawing CST-P-1000-A145 – Typical Temporary Paved Road Access Pad**.
- Equipment pads or railroad car bridges without culverts. Refer to Company **Construction Drawing CST-P-1000-A350 – Typical Timber Mat Waterbody Bridge**.
- Clean rock fill and culvert(s). Refer to Company **Construction Drawing CST-P-1000-A335 – Typical Waterbody Bridge Rockfill and Flume**.
- Flexi-float or portable bridges. Refer to Company Construction Drawings **CST-P-1000-A340 – Typical Portable Waterbody Bridge**, **CST-P-1000-A345 – Typical Portable Waterbody Bridge with Culver Support**, and **CST-P-1000-A355 – Typical Flexi-Float Waterbody Bridge**.
- When pre-approved by the Company Representative, alternate methods/designs (which achieve the performance objectives specified above) may be used.

7.5.7. Contractor shall maintain equipment bridges to prevent soil from entering the water body.

7.5.8. Unless the Army Corp of Engineers (or its delegated agency) authorizes a bridge as 'permanent', Contractor shall remove equipment bridges as soon as possible after permanent seeding.

7.6. Contractor shall complete waterbody crossings in conformance with the Scope of Work, associated site-specific drawings or permit conditions. Crossing methods include:

- Dam and pump method. Refer to site-specific Construction drawing.
- Dry-ditch method. Refer to site-specific Construction drawing.
- Flume crossing method. Refer to site-specific Construction drawing.
- Horizontal directional drill method. Refer to site-specific Construction drawing.

7.7. Contractor shall install sediment barriers immediately after disturbing the water body (or adjacent upland) to prevent soil erosion or sedimentation from flowing into the wetland or waterbody. Sediment barriers shall be maintained throughout construction and reinstalled when necessary (such as after backfilling the trench), until they are replaced by permanent erosion controls and/or adjacent upland areas are completely restored.

7.8. Trench dewater shall be filtered to prevent heavily silt-laden water discharge into any wetland or waterbody. The filtration system shall be installed on the ROW or within areas approved by the Company Representative. Refer to Company Construction Drawings **CST-P-1000-A165 – Typical Geotextile Filter Bag for Dewatering** and **CST-P-1000-B170 – Typical Straw Bale Dewatering Structure Large Volume**.

7.9. Water body crossing restoration activities shall be completed in conformance with the Scope of Work or site-specific permit conditions.

8. Wetland Crossings

8.1. Contractor shall install wetland crossings in conformance with the Scope of Work, Construction drawings or permit conditions. Company Representative must approve any changes in work areas.

8.2. The Contractor shall implement all construction procedures for waterbody crossings in the event the wetland crossing is located adjacent to or within a wetland.

8.3. General work area requirements:

8.3.1. Contractor shall only use extra work areas (such as staging areas and additional spoil storage areas) identified in the Scope of Work or Construction drawings as permit conditions allow.

8.3.2. Contractor shall limit vegetation clearing between extra work areas and the wetland edge to the Company-authorized construction ROW.

8.3.3. Contractor may use construction ROW for access only when wetland soil is stabilized to a degree that allows equipment passage without creating ruts. Stabilization of ROW may be accomplished with timber riprap, prefabricated equipment mats, or terra mats.

8.3.4. Contractor shall ensure that all construction equipment other than that necessary to install the wetland crossing shall use access roads located in upland areas. Prior to placement of wetland matting, and where access roads in upland areas do not provide reasonable access, Contractor shall limit all other construction equipment to one pass through the wetland using the construction ROW.

8.3.5. Company Representative shall approve extra work areas prior to use.

8.4. General wetland crossing procedures and requirements:

8.4.1. Contractor shall comply with Section 404, Nationwide Permit Program Terms and Conditions (33 CFR Part 330) or as directed by the Company Representative.

8.4.2. Contractor shall assemble pipeline in an upland area unless the wetland is dry enough to support skids and pipe. Where water and other site conditions allow, Contractor shall use 'push-pull' or 'float' techniques to place the pipe in trench.

8.4.3. Contractor shall minimize the duration of construction-related disturbance within wetlands as allowed by permit.

8.4.4. Contractor shall not store hazardous materials, chemicals, fuels, or lubricating oils in a wetland or within 100 feet of any wetland boundary. Contractor shall not perform concrete coating activities in a wetland or within 100 feet of any wetland boundary.

8.4.5. Except when site conditions prevent access, Contractor shall refuel all construction equipment in upland areas at least 100 feet from a wetland boundary. If refueling of construction equipment is required in a wetland or within 100 feet of any wetland boundary, Contractor shall comply with the project-specific Spill Prevention and Response Procedure.

8.4.6. Contractor shall limit construction equipment operating in wetland areas to that necessary to clear the ROW, dig trench, fabricate and install pipeline, backfill trench and restore ROW. All other construction equipment shall use approved access roads located in upland areas. Where access roads in upland areas do not provide reasonable access, Contractor shall limit all other construction equipment to one pass through the wetland using the ROW.

8.4.7. Contractor shall clear vegetation by cutting it off at the ground level, leaving existing root systems in place. Contractor shall remove cut vegetation from the wetland for disposal.

8.4.8. Contractor shall limit grading activities and removing tree stumps to areas directly over the trench line. Contractor shall not grade or remove stumps or root systems from other wetland areas of the ROW unless the Company Representative determines that safety-related construction constraints require the removal of tree stumps from the working side of the ROW.

8.4.9. Contractor shall segregate the top foot of topsoil from the area disturbed by trenching. In areas with less than 12-inches of topsoil, Contractor shall segregate the entire topsoil layer disturbed by trenching. Soil separation is not required where standing water or soils are saturated or frozen. Immediately after backfilling is completed, Contractor shall restore segregated topsoil to its original location.

8.4.10. In standing water or saturated soils, Contractor shall use low ground-weight construction equipment or operate normal equipment from timber riprap, prefabricated equipment mats, terra mats, or equivalent (to prevent mixing of topsoil and subsoil).

8.4.11. Contractor shall not cut trees outside the construction ROW to obtain timber riprap or equipment mats. Contractor shall use no more than two layers of timber riprap to stabilize ROW.

8.4.12. Contractor shall remove all timber riprap, prefabricated equipment mats, or other material used to support equipment on the construction ROW when restoring to pre-construction conditions.

8.4.13. Contractor shall remove water from the trench to prevent heavily silt-laden water from flowing into any wetland. Contractor shall remove dewatering structures as soon as possible after dewatering activities are completed. Refer to Company Construction Drawings **CST-P-1000-A165 – Typical Geotextile Filter Bag for Dewatering** and **CST-P-1000-B170 – Typical Straw Bale Dewtering Structure Large Volume**.

8.4.14. Contractor shall install sediment barriers across the entire construction ROW immediately upslope of the wetland boundary at all wetland crossings (to prevent sediment flow into adjacent wetlands).

8.4.15. Contractor shall install sediment barriers along the edge of the construction ROW (to prevent sediment flow into adjacent wetlands and contain spoil and sediment within the ROW).

8.4.16. Contractor shall remove all sediment barriers during ROW cleanup.

8.5. Restoration of wetland crossings shall include:

8.5.1. Contractor shall construct trench breakers and/or seal the trench bottom (to maintain the original wetland hydrology).

8.5.2. To avoid transporting sediment into wetlands, Contractor shall install:

- Permanent slope breakers across the construction ROW.
- Trench breakers at the base of slopes greater than 5% where the base of the slope is less than 50 feet from the wetland boundary.
- Trench breakers between wetlands and adjacent disturbed upland area, where required.

In areas adjacent to wetlands, earthen berms may be used as sediment barriers when approved by the Company Representative.

8.5.3. Contractor shall comply with the wetland restoration plan as directed by Company Representative. Contractor shall prevent the introduction or spread of undesirable exotic vegetation.

8.5.4. When final revegetation and stabilization of upland areas are accepted (in conformance with applicable standards) by the Environmental Inspector or Company Representative, the Company (or Contractor, if designated) shall remove all remaining temporary sediment barriers.

9. Hydrostatic Testing

9.1. Contractor shall use water sources and at locations only as permitted in the Scope of Work or as approved by the Company Representative.

9.2. Contractor shall discharge hydrotest water at locations only as permitted in the Scope of Work or as approved by the Company Representative.

9.3. Contractor shall keep the Company Representative informed of testing schedules, so that required notifications to agencies or landowners are completed in compliance with permit conditions.

9.4. Contractor shall notify Company Representative immediately upon a hydrotest failure, so that required notifications to agencies or landowners are completed in compliance with permit or other statutory requirements.

9.5. Contractor shall pre-clean facilities, dispose of waste, and dry facilities in conformance with the Scope of Work and waste regulations.

9.6. The following general requirements shall be met for all hydrotesting projects:

9.6.1. Contractor shall perform radiographic inspection in compliance with **Construction Standard C1070 - Non-Destructive Examination Requirements** before installation under water bodies or wetlands.

9.6.2. If pumps used for hydrostatic testing are located within 100 feet of any water body or wetland, Contractor shall operate and refuel pumps in compliance with the project's Spill Prevention and Response Procedure.

9.6.3. Contractor shall screen the intake hose to prevent entraining fish.

9.6.4. Contractor shall maintain flow rates to protect aquatic life, provide for all water body uses, and provide for downstream water withdrawals by existing users.

9.6.5. Contractor shall locate hydrostatic test manifolds outside wetlands and riparian areas to the maximum extent practicable.

9.7. Contractor shall regulate discharge rates, use energy dissipation devices, and install sediment barriers as necessary to prevent erosion, streambed scour, sediment suspension, or excessive stream flow in compliance with permit conditions. Refer to Company Construction Drawings **CST-P-1260-A180.1 – Typical Silt Fence Sediment Barrier Erosion Control**, **CST-P-1260-A180.2 – Typical Silt Fence Sediment Barrier Erosion Control**, **CST-P-1260-A190.1 – Typical Straw Bale Sediment Barrier Erosion Control** and **CST-P-1260-A190.2 – Typical Straw Bale Sediment Barrier Erosion Control**.

10. Cleanup Procedures

10.1. Contractor shall commence cleanup operations immediately following backfill operations.

10.2. Unless otherwise approved by the Company Representative, Contractor shall complete final cleanup and install permanent erosion control structures within 14 days (10 days in residential areas) after trench is backfilled or construction on surface facilities is completed.

10.2.1. If seasonal or other weather conditions prevent compliance with Cleanup deadlines, all temporary erosion-control structures shall be maintained as originally installed until conditions allow cleanup completion as approved by the Company Representative.

10.3. Contractor shall backfill and regrade to restore final grade (pre-construction contours) and leave soil in condition for planting.

10.4. In agricultural fields and residential areas where slope breakers are not typically required, Contractor shall install trench breakers at the same spacing as if permanent slope breakers were required. If the Company determines that additional trench breakers are required, Contractor shall install breakers as directed.

10.5. Rock excavated from the trench may be used to backfill the trench only to the top of the existing bedrock profile. Rock that is not returned to the trench shall be considered removable construction debris, unless approved for alternate use by the landowner or land managing agency.

10.6. Segregated topsoil shall not be used to pad the pipeline.

10.7. Contractor shall de-compact subsoil and topsoil as identified in the Scope of Work, Construction drawings, or ROW line list. Contractor shall test for de-compaction in conformance with permit conditions or landowner request.

10.8. Contractor shall remove excess rock from at least the top 12-inches of soil in all actively cultivated or rotated cropland and pastures, hayfields, residential areas, and in other areas at the landowner's request.

10.9. Geomorphic features such as embankments, terraces, and slopes shall be restored. BMP's shall be used to stabilize streambeds and banks, natural drainage ways, and steep grades in conformance with permit requirements.

10.10. Contractor shall construct and maintain permanent slope breakers in all areas except cultivated areas and lawns using the spacing recommendations in Table C1260 / 3.4 (above).

10.10.1. If a local soil conservation authority or land-managing agency requires additional slope breakers, Contractor shall install additional slope breakers as directed.

10.11. Contractor shall mulch all slopes adjacent to wetlands and waterbodies with 3 tons per acre of weed-free hay or straw for a minimum of 10 feet on either side of the wetland or water body.

10.12. Contractor shall leave a travel lane open along the ROW to allow construction traffic access. The travel lane shall be restored when access to the ROW is no longer required for construction or revegetation.

10.13. Contractor shall collect all trash, litter, and foreign debris for disposal as directed by Company Representative and in conformance with State and local regulations. Trash, litter, and construction material debris shall **not** be discarded in the trench or along the ROW.

10.14. Contractor shall repair all structures, fences, hedges, buildings, and/or other property damaged during construction as required by the landowner and/or Company Representative. Contractor shall **immediately** repair all damage incurred during construction when such repair is too urgent to be relegated to a cleanup crew.

10.15. Contractor shall install permanent slope breakers (terraces) along the ROW where requested by the Company Representative, specified in this Section, or in conformance with the Scope of Work. Concentrations of surface flow shall be diverted to stabilized outlets using slope breakers with a 2% to 8% outslope directed toward energy-dissipating devices located off the ROW. Refer to Company Construction Drawings **CST-P-1260-A220.1 – Typical Slope Breaker** and **CST-P-1260-A220.2 – Typical Slope Breaker**.

11. Revegetation

11.1. Contractor shall perform revegetation activities in conformance with the Scope of Work, Construction drawings, ROW line list, or permit conditions, including:

- Fertilize and amend areas
- Prepare seedbed
- Seed with specified seed mixtures
- Install mulch or temporary cover
- Remove temporary erosion control structures where revegetation is accepted by the Company Representative

11.2. Contractor shall perform seeding in all areas except actively-cultivated croplands and surface facilities as directed by the Company Representative.

11.3. Contractor shall continue using temporary erosion-control measures, if seeding cannot be done within recommended seeding dates as directed by Company Representative.

11.4. Contractor shall mulch all slopes (except in actively-cultivated cropland) concurrently or immediately after seeding (where necessary to stabilize the soil surface and to reduce wind and water erosion).

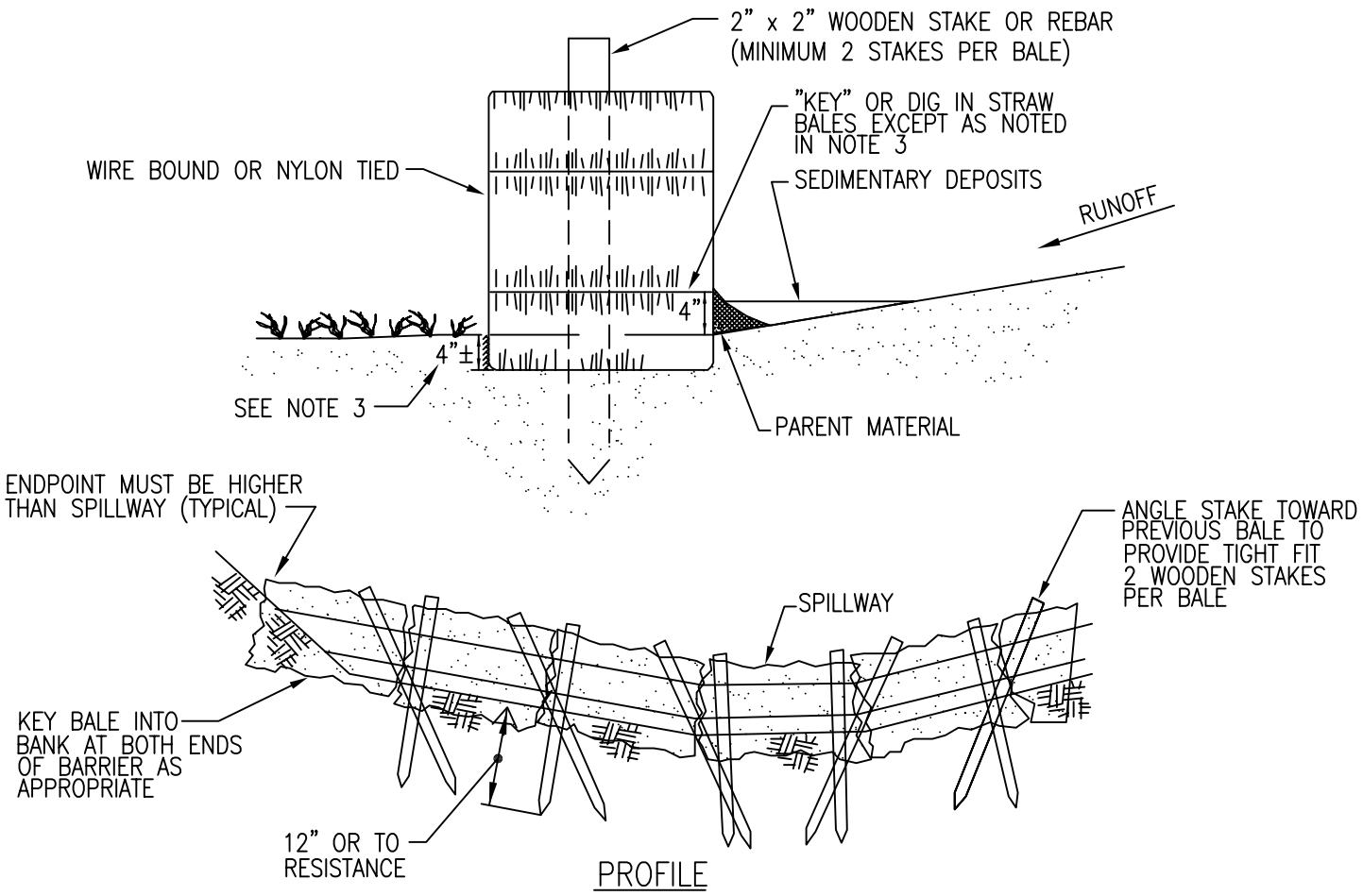
11.4.1. Contractor shall mulch before seeding if:

- Final grading and installation of permanent erosion-control measures will not be completed within 14 days after the trench in that area is backfilled (10 days in residential areas)
- Construction or restoration activity is interrupted for extended periods (e.g. when seeding cannot be completed due to seeding period restrictions)

11.4.2. Jute thatching or bonded fiber blankets shall be accepted as alternatives to straw mulch. Biodegradable erosion control fabric shall be used on water body banks to stabilize seeded areas and other sensitive areas (where using mulch and anchoring tools is impractical).

11.5. Contractor shall install and maintain vehicle control measures as directed by the Company Representative. These measures may include, but are not limited to:

- Signs
- Fences with locking gates
- Slash and timber barriers, pipe barriers, or line of boulders across the ROW
- Conifers or other specified trees or shrubs planted across the ROW



PROFILE

NOTES:

1. STRAW BALE SEDIMENT BARRIERS SHALL BE INSTALLED AT THE FOLLOWING LOCATIONS:
   - THE BASE OF ALL SLOPES ABOVE ROADS, SPRINGS, WETLANDS, IMPOUNDMENTS AND FLOWING STREAMS.
   - THE DOWNSLOPE RIGHT-OF-WAY EDGE WHERE ANY OF THE ABOVE-MENTIONED LOCATIONS ARE ADJACENT TO THE RIGHT-OF-WAY.
   - BETWEEN TOPSOIL/SPOIL STOCKPILES AND STREAMS OR WETLANDS AS NEEDED.
   - ALONG R.O.W. BOUNDARIES IN WETLAND CONSTRUCTION.
   - AS SPECIFIED IN THE SPILL PREVENTION, CONTAINMENT, AND COUNTERMEASURE PLAN.
   - AS DIRECTED BY THE COMPANY'S REPRESENTATIVE.
2. STRAW BALE SEDIMENT BARRIERS SHALL CONSIST OF A ROW OF STRAW BALES, PLACED ON THE FIBER-CUT EDGE (TIES NOT IN CONTACT WITH THE GROUND). BALES SHALL BE TIGHTLY ABUTTED TO ONE ANOTHER. THE BARRIER SHALL BE ONE BALE HIGH. ONLY CERTIFIED "NOXIOUS WEED-FREE" STRAW SHALL BE USED WHENEVER POSSIBLE.
3. ENTRENCH ("KEY") STRAW BALES INTO THE GROUND TO A DEPTH OF 4" EXCEPT IN FROZEN, SATURATED, OR EXTREMELY ROCKY SOILS. PLACE PARENT MATERIAL ON UPSTREAM SIDE OF STRAW BALES TO PREVENT UNDERMINING.
4. WALK ON STRAW BALES TO INSURE ADEQUATE BALE-TO-SOIL CONTACT.
5. ANCHOR STRAW BALES SECURELY IN PLACE WITH TWO WOODEN OR STEEL REBAR STAKES DRIVEN THROUGH THE TOPS OF THE BALES. THE STAKES SHALL PENETRATE THE GROUND A DISTANCE OF 12" UNLESS ROCK OR AN IMPERMEABLE LAYER IS ENCOUNTERED:
   - THE FIRST, CENTER AND END BALES OF THE BARRIER SHALL HAVE STAKES DRIVEN VERTICALLY THROUGH THE BALE.
   - BALES, OTHER THAN THOSE LOCATED AT THE ENDS OR CENTER OF THE BARRIER, SHALL HAVE THE FIRST STAKE DRIVEN THROUGH THE TOP OF THE BALE AT AN ANGLE SO THAT THE STAKE PASSES THROUGH THE PREVIOUSLY PLACED BALE, IN ORDER TO PROVIDE TIGHT CONTACT BETWEEN BALES. THE SECOND STAKE SHALL BE DRIVEN VERTICALLY THROUGH THE TOP OF THE BALE.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

REVISIONS

NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	02/27/04	ISSUED FOR REVIEW	RB	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

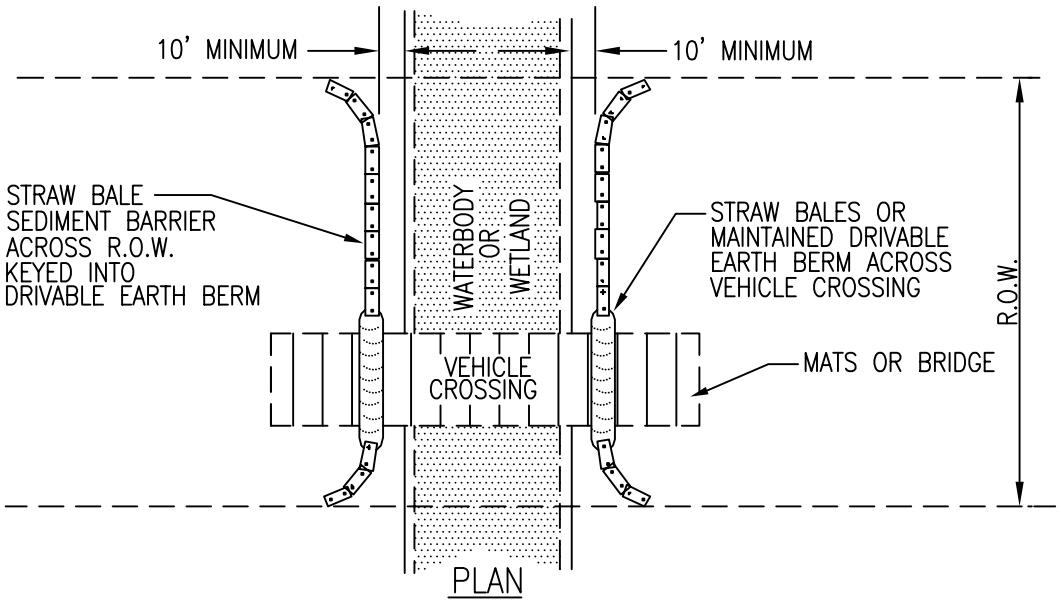
KINDER MORGAN INC

TYPICAL STRAW BALE SEDIMENT BARRIER
EROSION CONTROL

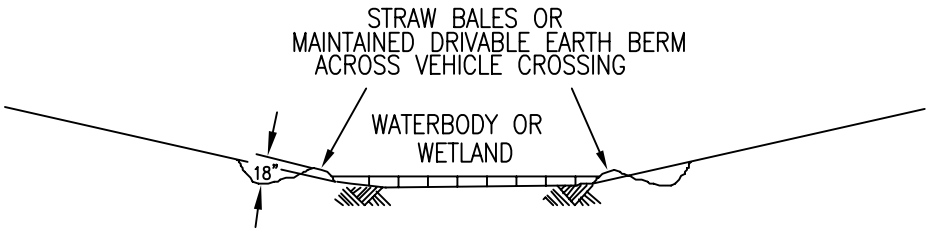
DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST-P-1260-A190.1	SH. 1 OF 2

NOTES:

6. PLACE STRAW BALES SO THEY ARE EFFECTIVE BUT DO NOT HINDER CONSTRUCTION. IF NECESSARY A 15' GAP IN STRAW BALE BARRIERS SHALL BE PROVIDED AS NEEDED TO ACCOMMODATE TRAFFIC ON TEMPORARY CONSTRUCTION ROADS. THE GAP SHALL BE CLOSED AT THE END OF EACH WORK DAY, USING STRAW BALE BARRIERS, OR A DRIVABLE EARTH BERM TIED INTO ADJACENT STRAW BALES. THE BALES USED TO CLOSE THE GAP SHALL BE PLACED ON THE UPHILL SIDE OF THE STRAW BALE BARRIER, THE END BALES OF THE GAP SEGMENT SHALL OVERLAP A MINIMUM OF 12".
7. MONITOR FOR UNDERMINING OR FLOW-AROUND. INSPECT BALE POSITION TO ASSURE THAT THEY REMAIN CLOSE TOGETHER. MAINTAIN STRAW BALE BARRIERS BY REPLACING DAMAGED BALES AND REMOVING SEDIMENT LOAD. WHEN SEDIMENT LOAD IS GREATER THAN 60% BEHIND THE BARRIER, SEDIMENT SHALL BE REMOVED AND PLACED IN AN AREA WHERE IT SHALL NOT REENTER THE BARRIER OR A WATERWAY. IF SEDIMENT BEHIND STRAW BALE BARRIERS CANNOT BE REMOVED, A SECOND ROW OF BALES SHALL BE INSTALLED UPSLOPE OF THE BARRIER.
8. WHERE STRAW BALES AND SILT FENCE ARE INSTALLED AS A UNIT, THE STRAW BALES SHALL BE INSTALLED ON THE DOWN SLOPE SIDE OF THE SILT FENCE.
9. EROSION CONTROL STRUCTURES SHALL BE INSPECTED DAILY IN AREAS OF ACTIVE CONSTRUCTION. STRUCTURES SHALL BE INSPECTED WEEKLY AT INACTIVE CONSTRUCTION AREAS AND WITHIN 24 HOURS OF EACH 0.5 INCH RAINFALL EVENT. STRUCTURES SHALL BE REPAIRED AS NECESSARY.
10. STRAW BALE BARRIERS SHALL BE REMOVED ONLY AS DIRECTED BY THE COMPANY'S REPRESENTATIVE.



PLAN



PROFILE

DRIVABLE BERM NOTES:

1. A MAINTAINED DRIVABLE EARTH BERM MAY BE INSTALLED ACROSS VEHICLE CROSSINGS IN LIEU OF STRAW BALES.
2. BERM MUST BE TIED INTO STRAW BALES.
3. BERM MUST BE MAINTAINED TO ENSURE SEDIMENT TRAPPING CAPACITY.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

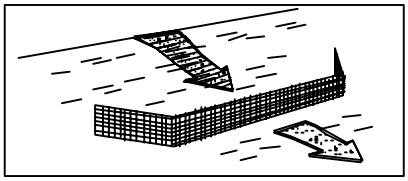
REVISIONS

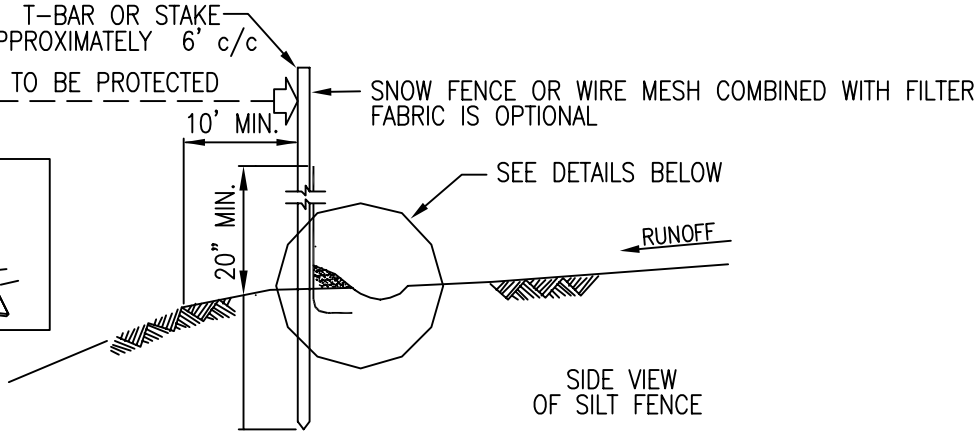
NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	03/12/04	ISSUED FOR REVIEW	RB	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

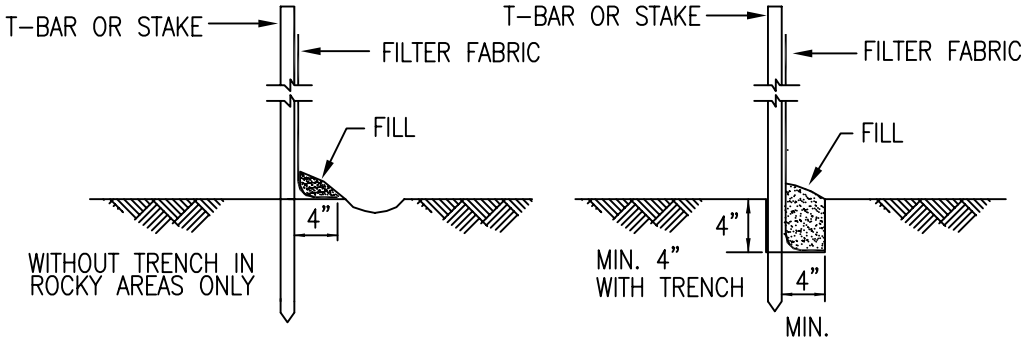
KINDER MORGAN INC

TYPICAL STRAW BALE SEDIMENT BARRIER EROSION CONTROL

DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST-P-1260-A190.2	SH. 2 OF 2







NOTES:

1. GENERALLY WHEN A LONG SEDIMENT BARRIER IS REQUIRED, SILT FENCE WILL BE UTILIZED RATHER THAN STRAW BALES AT:
   - THE BASE OF ALL SLOPES ABOVE ROADS, SPRINGS, WETLANDS, IMPOUNDMENTS AND PERENNIAL AND INTERMITTENT STREAMS.
   - THE DOWN SLOPE RIGHT-OF-WAY EDGE WHERE ANY OF THE ABOVE MENTIONED LOCATIONS ARE ADJACENT TO THE RIGHT-OF-WAY.
   - BETWEEN TOPSOIL/SPOIL STOCKPILES AND PERENNIAL OR INTERMITTENT STREAMS OR WETLANDS WHERE BUFFER ZONE REQUIREMENTS CANNOT BE MET.
   - ALONG R.O.W. BOUNDARIES OF WETLAND CONSTRUCTION.
   - AS SPECIFIED IN THE SPILL PREVENTION, CONTAINMENT, AND COUNTERMEASURE PLAN.
   - AS DIRECTED BY THE COMPANY'S REPRESENTATIVE.
2. THE SILT FENCE SHALL BE CONSTRUCTED AS FOLLOWS:
   - FABRIC USED FOR THE SILT FENCE SHALL BE A "STANDARD STRENGTH" GEOTEXTILE, SUCH AS MIRAFI 100X OR AN APPROVED EQUIVALENT.
   - THE FABRIC SHALL BE CUT FROM A CONTINUOUS FABRIC ROLL.
   - THE HEIGHT OF THE FENCE SHALL NOT EXCEED 24".
   - SPLICES SHALL ONLY BE DONE AT POSTS AND SHALL CONSIST OF A MINIMUM OF 6" OF OVERLAP WITH BOTH ENDS SECURED TO THE POST.
   - POSTS SHALL BE POSITIONED A MAXIMUM OF 10' APART.
   - POSTS SHALL CONSIST OF 2"X2" WOODEN STAKES, OR EQUIVALENT, OF SUFFICIENT LENGTH TO EXTEND A MINIMUM OF 12" INTO THE GROUND.
   - FABRIC SHALL BE STAPLED OR WIRED TO POSTS A MAXIMUM OF EVERY 9".
3. THE SILT FENCE SHALL BE INSTALLED AS SPECIFIED BY THE MANUFACTURER OR AS FOLLOWS:
   - A TRENCH, 4" WIDE AND 4" DEEP, SHALL BE EXCAVATED ALONG THE CONTOUR. THE POST SHALL BE DRIVEN INTO THE BOTTOM OF THE TRENCH ON THE DOWNSTREAM SIDE OF THE FILTER FABRIC. THE TRENCH SHALL BE BACK FILLED AND COMPACTED, ENSURING 4" OF FENCE IS BURIED WITHIN THE TRENCH.
   - IN AREAS WHERE THE TERRAIN IS TOO ROCKY FOR TRENCHING, A 4" GROUND FLAP WITH ROCK FILL TO HOLD IT IN PLACE SHALL BE USED.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

REVISIONS

NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	02/27/04	ISSUED FOR REVIEW	RB	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

KINDER MORGAN INC

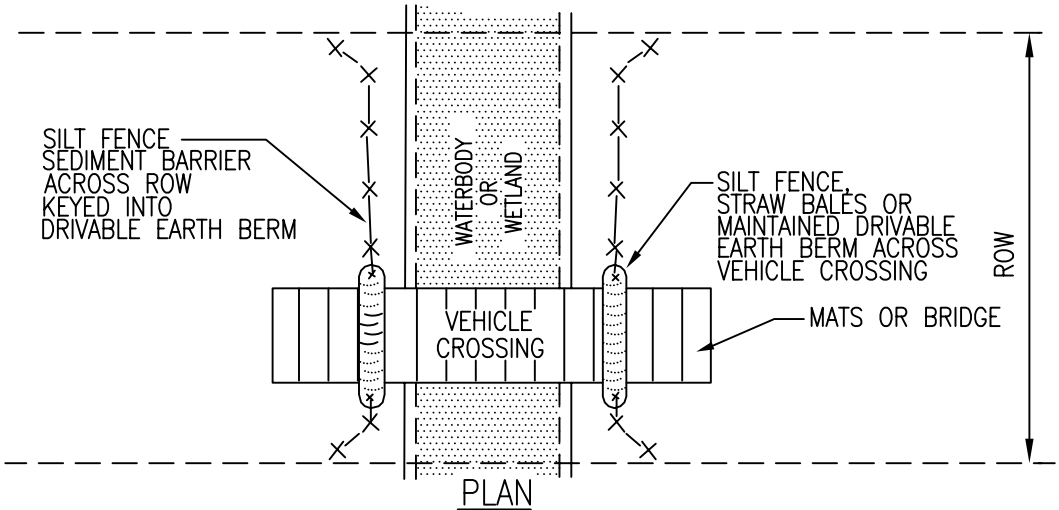
TYPICAL SILT FENCE SEDIMENT BARRIER
EROSION CONTROL

DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST-P-1260-A180.1	SH. 1 OF 2

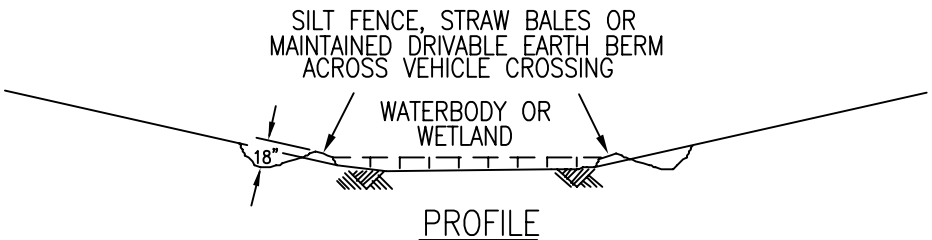
NOTES:

- SILT FENCES PLACED AT THE TOE OF A SLOPE SHALL BE SET AT LEAST 6' DOWN GRADIENT FROM THE TOE OF THE SLOPE (WHERE POSSIBLE) IN ORDER TO INCREASE PONDING.
- SILT FENCE PLACED AT THE TOP OF SLOPES SHALL BE AT LEAST 10' BELOW THE CREST.
- SILT FENCES PLACED AT THE BASE OF SPOIL OR TOPSOIL STOCKPILES SHALL EXTEND AROUND THE BASE OF THE PILES IN ORDER TO CONTAIN ANY SEDIMENTS AND/OR PREVENT FLOW-AROUND.
- WHEN INSTALLING SILT FENCES IN DRAINAGES, EXTEND THE FENCE UP THE CHANNEL BANKS AND TURN BOTH ENDS AT A SLIGHT ANGLE TOWARDS THE CENTER OF THE RIGHT-OF-WAY.
- UPON THE REQUEST OF THE COMPANY'S INSPECTOR, SNOW FENCE, STRAW BALE OR WIRE MESH SHALL BE USED IN CONJUNCTION WITH THE SILT FENCE. IF WIRE MESH OR SNOW FENCE IS USED, THE WIRE SHALL BE ATTACHED TO THE POSTS USING WIRE TIES OR HEAVY DUTY STAPLES PRIOR TO INSTALLATION OF THE FABRIC. THE WIRE OR SNOW FENCE SHALL BE "KEYED" INTO THE TRENCH AT LEAST 2" AND EXTEND UP THE POSTS TO THE TOP OF THE FABRIC.
- IF REQUIRED, A 15' GAP SHALL BE LEFT IN THE SILT FENCE TO ACCOMMODATE TRAFFIC ON TEMPORARY CONSTRUCTION ROADS. HOWEVER, A SECTION OF SILT FENCE OR A DRIVABLE EARTH BERM TIED INTO ADJACENT SILT FENCE SHALL BE USED TO CLOSE THE GAP AT THE END OF EACH DAY. THE SILT FENCE USED TO CLOSE THE GAP MUST OVERLAP THE ENDS OF THE PERMANENT SILT FENCE FOR A MINIMUM OF 24", AND SHALL BE "KEYED" INTO THE GROUND THE SAME AS THE FILTER FABRIC ON EITHER SIDE OF THE GAP.

4. SILT FENCES SHALL BE CHECKED AND MAINTAINED ON A REGULAR BASIS. THE DEPTH OF THE ANCHOR TRENCH SHALL BE ADJUSTED IF UNDERMINED. SHOULD INSPECTION REVEAL SEDIMENT LOADING AT OR NEAR 40% CAPACITY, THE SEDIMENT SHALL BE REMOVED AND PLACED IN AN AREA WHERE IT SHALL NOT REENTER THE SILT FENCE IMPOUNDMENT OR A WATERWAY.
5. SILT FENCE SHALL BE REMOVED ONLY AS DIRECTED BY THE COMPANY'S REPRESENTATIVE.
6. EROSION CONTROL STRUCTURES SHALL BE INSPECTED DAILY IN AREAS OF ACTIVE CONSTRUCTION. STRUCTURES SHALL BE INSPECTED WEEKLY AT INACTIVE CONSTRUCTION AREAS AND WITHIN 24 HOURS OF EACH 0.5 INCH RAINFALL EVENT. STRUCTURES SHALL BE REPAIRED AS NECESSARY.



PLAN



PROFILE

DRIVABLE BERM NOTES:

1. A MAINTAINED DRIVABLE EARTH BERM MAY BE INSTALLED ACROSS THE VEHICLE CROSSING IN LIEU OF SILT FENCE OR STRAW BALES.
2. BERM MUST BE TIED INTO SILT FENCE.
3. BERM MUST BE MAINTAINED TO ENSURE SEDIMENT TRAPPING CAPACITY.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

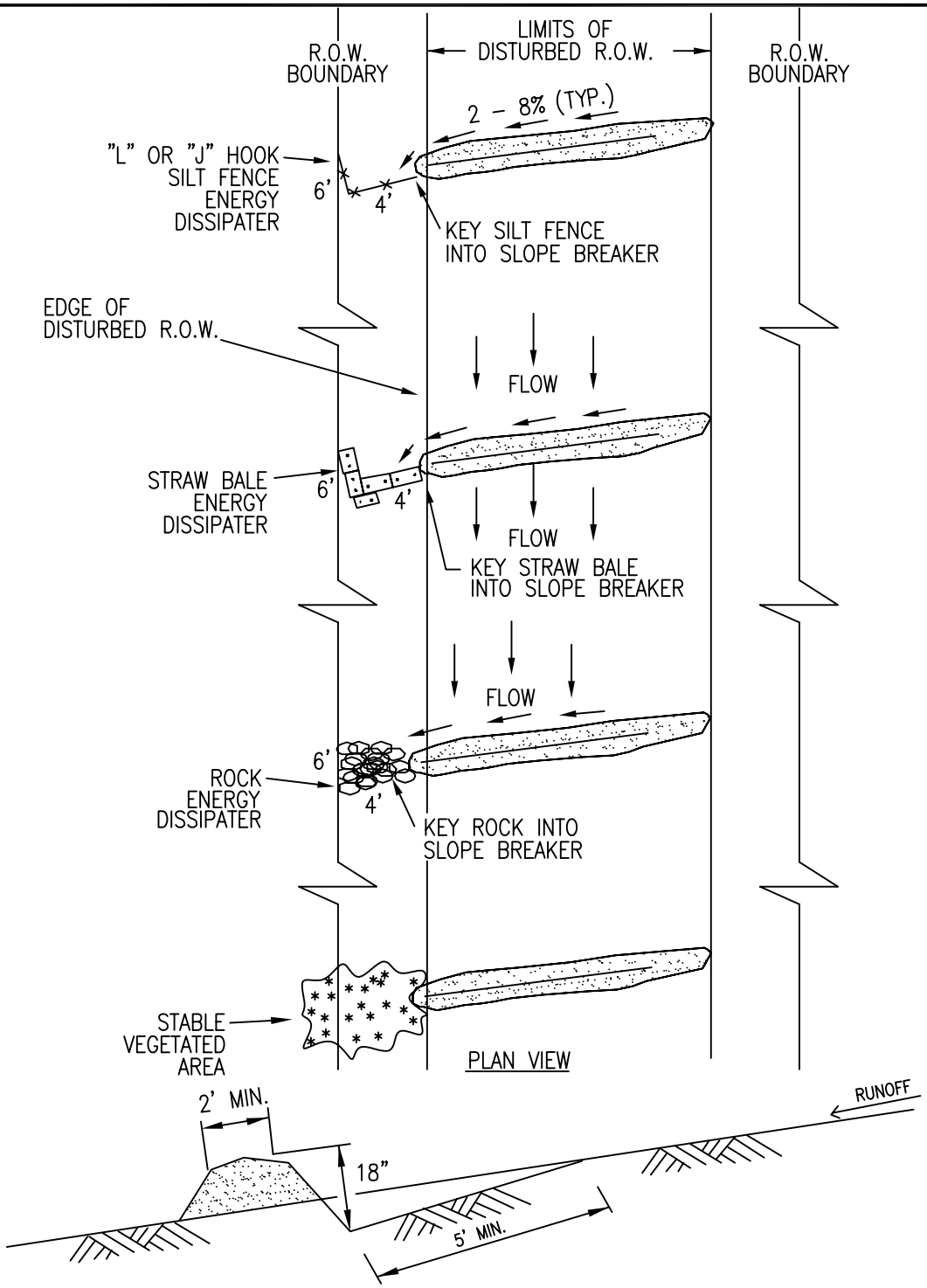
REVISIONS

NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	02/27/04	ISSUED FOR REVIEW	RB	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

KINDER MORGAN INC

TYPICAL SILT FENCE SEDIMENT BARRIER
EROSION CONTROL

DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST-P-1260-A180.2	SH. 2 OF 2



SLOPE BREAKER CROSS SECTION DETAIL

NOTES:

1. SLOPE BREAKERS SHALL BE CONSTRUCTED OF COMPACTED NATIVE SOIL AND INSTALLED AT LOCATIONS AS REQUIRED BY SECTION C1260 OF CONSTRUCTION STANDARDS OR AS DIRECTED BY THE COMPANY'S REPRESENTATIVE.
2. SLOPE BREAKERS SHALL BE ORIENTED AS SHOWN OR OTHER PATTERN AS DIRECTED BY THE COMPANY'S REPRESENTATIVE TO DIRECT THE WATER OFF THE R.O.W.
3. SLOPE BREAKERS SHALL BE CONSTRUCTED AT A 2–8% GRADIENT ACROSS THE SLOPE.
4. THE SLOPE BREAKERS SHALL BE 18" DEEP (AS MEASURED FROM THE TROUGH TO THE TOP OF THE SLOPE BREAKER). THE THROUGH WILL BE A MINIMUM OF 5' WIDE ACROSS THE WIDTH OF THE RIGHT–OF–WAY.

*SEE DWG. #CST–P–1260–A220.2 FOR ADDITIONAL INFORMATION.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

REVISIONS

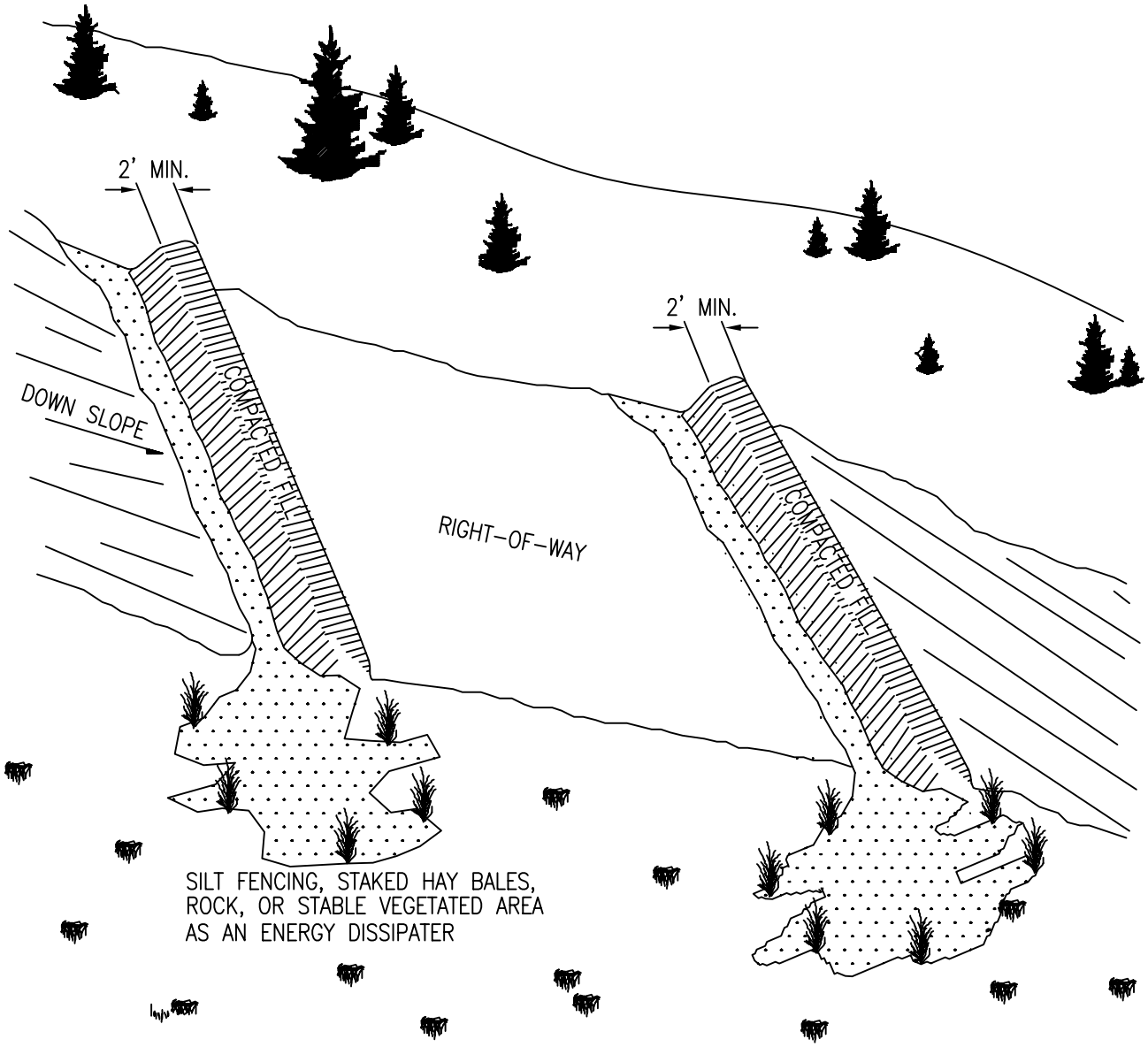
NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	03/12/04	ISSUED FOR REVIEW	RB	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

KINDER MORGAN INC

TYPICAL SLOPE BREAKER

DATE: 07/01/05 | APPROVED BY:

SCALE: N.T.S. | CST–P–1260–A220.1 | SH. 1 OF 2



NOTES: (CONTINUED)

5. THE OUTLET OF THE SLOPE BREAKER MUST FREELY DISCHARGE ALL RUNOFF OFF THE DISTURBED RIGHT-OF-WAY INTO A STABLE, WELL VEGETATED AREA OR INTO AN ENERGY DISSIPATER.
6. WHERE SLOPE BREAKERS EXTEND BEYOND THE EDGE OF THE CONSTRUCTION R.O.W. TO DIRECT RUNOFF INTO STABLE, WELL VEGETATED AREAS, THESE LOCATIONS MUST BE APPROVED BY THE COMPANY'S REPRESENTATIVE.

FLOW ENERGY DISSIPATER NOTES:

1. THE OUTLET SHALL CONTAIN AN ENERGY DISSIPATER IF THE COMPANY'S INSPECTOR DETERMINES EXISTING VEGETATION IS NOT SUFFICIENTLY STABLE TO PREVENT EROSION. THE ENERGY DISSIPATER SHALL BE CONSTRUCTED AS FOLLOWS:
   - OUTFALL END OF DISSIPATER SHOULD BE LOWER THAN SLOPE BREAKER END.
   - SILT FENCE, STRAW BALE OR ROCK DISSIPATERS SHOULD BE KEYED INTO THE END OF THE SLOPE BREAKER.
   - PROVIDE ENOUGH AREA INSIDE "L" TO CAPTURE AND HOLD SEDIMENT.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

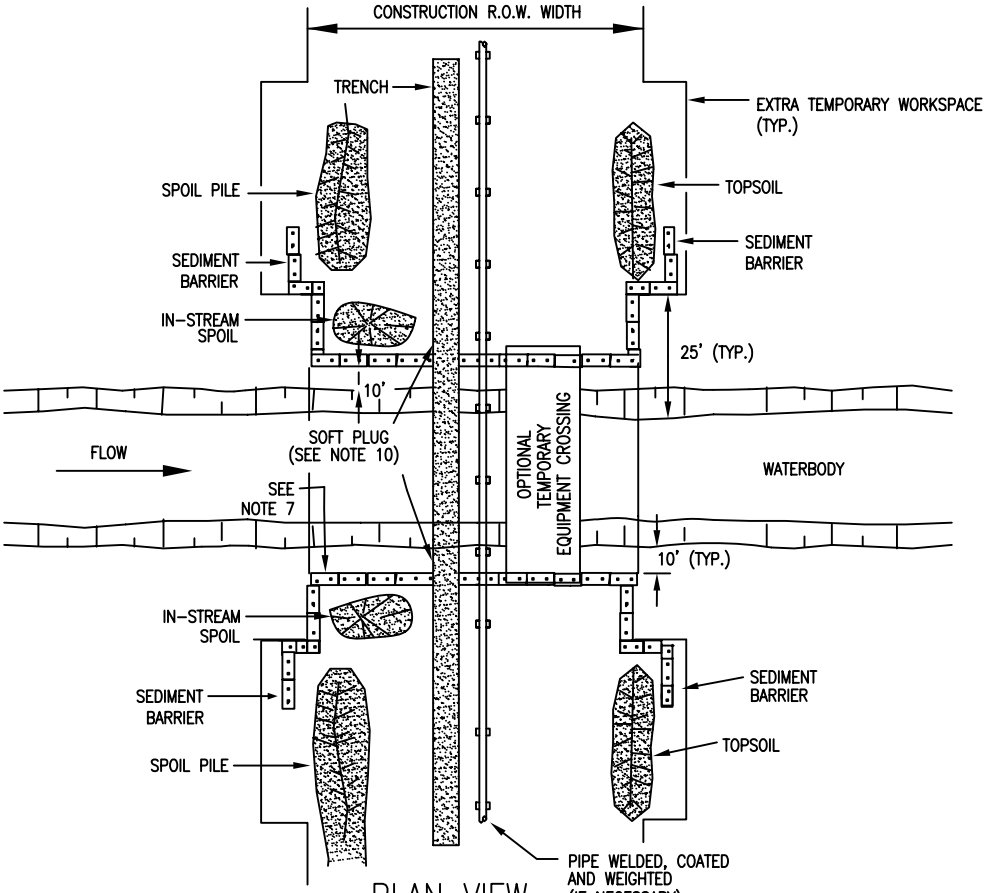
REVISIONS

NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	03/12/04	ISSUED FOR REVIEW	RB	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

KINDER MORGAN INC

TYPICAL SLOPE BREAKER

DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST-P-1260-A220.2	SH. 2 OF 2



PLAN VIEW

NOTES:

1. METHOD APPLIES TO WATERBODIES THAT ARE NOT STATE-DESIGNATED FISHERIES WHERE FLUME CROSSINGS ARE NOT REQUIRED.
   - IF TOPOGRAPHY PERMITS TEMPORARY EQUIPMENT BRIDGE INSTALLATION, THE CONTRACTOR SHALL TRENCH, STRING, WELD, COAT, WEIGHT (IF NECESSARY), LOWER IN AND BACKFILL UTILIZING THE MAIN LINE CREW TRAVELING OVER THE BRIDGE.
   - IF TOPOGRAPHY PROHIBITS INSTALLATION OF A TEMPORARY EQUIPMENT BRIDGE, CONTRACTOR SHALL TRENCH UP TO BOTH SIDES OF CROSSING; STRING, WELD, COAT AND WEIGHT (IF NECESSARY) USING THE MAINLINE CREW. IN STREAM EXCAVATION, LOWER IN, AND BACKFILL WILL UTILIZES A CLAM OR HOES WORKING FROM THE BANKS.
2. SCHEDULE CROSSING DURING LOW FLOW PERIOD IF POSSIBLE.
3. COMPLETE ALL IN-STREAM ACTIVITIES WITHIN 24 HOURS IF FEASIBLE.
4. NO REFUELING OF MOBILE EQUIPMENT WITHIN 100 FEET OF WATERBODY. REFUEL STATIONARY EQUIPMENT AS PER THE SPCC PLAN.
5. INSTALLATION OF TEMPORARY EQUIPMENT CROSSING IS REQUIRED AT ALL STATE-DESIGNATED FISHERIES AND IS OPTIONAL AT THE DISCRETION OF THE COMPANY'S INSPECTOR AT ALL OTHER CROSSINGS. IF A TEMPORARY EQUIPMENT CROSSING IS INSTALLED, IT MUST BE BUILT IN ACCORD WITH SECTION PERMITS. PER APPLICABLE DRAWINGS CST-P-1000-A335, A340, A345, A350, A355.
6. IN AGRICULTURAL LAND, STRIP TOPSOIL FROM SPOIL STORAGE AREA.
7. CONSTRUCT SEDIMENT BARRIERS ALONG THE SIDES OF STOCKPILES AND ACROSS THE ENTIRE CONSTRUCTION R.O.W. TO PREVENT SILT LADEN WATER AND SPOIL FROM FLOWING BACK INTO WATERBODY. BARRIERS MAY BE TEMPORARILY REMOVE TO ALLOW CONSTRUCTION ACTIVITIES BUT MUST BE REPLACED BY THE END OF EACH WORK DAY.
8. IN-STREAM SPOIL TO BE STORED OUT OF THE STREAM CHANNEL A MINIMUM OF 10 FEET FROM THE WATERS EDGE AND WITHIN THE CONSTRUCTION R.O.W. UNLESS DEPICTED OTHERWISE IN SITE SPECIFIC CROSSING PLANS. TEMPORARY WORKSPACE MUST BE A MINIMUM OF 25' FROM THE WATERS EDGE.
9. TRENCH THROUGH WATERCOURSE USING MAINLINE EXCAVATION EQUIPMENT WHERE PRACTICAL.
10. INSTALL SOFT PLUGS AT THE EDGE OF STREAM BANKS UNTIL JUST PRIOR TO PIPE INSTALLATION TO CONTROL WATER FLOW & TRENCH SLOUGHING.
11. MAINTAIN STREAM FLOW THROUGHOUT CROSSING CONSTRUCTION.
12. BACKFILL WITH NATIVE MATERIAL.
13. RESTORE WATERBODY CHANNEL TO APPROXIMATE PRE-CONSTRUCTION PROFILE AND SUBSTRATE.
14. RESTORE STREAM BANKS TO APPROXIMATE ORIGINAL CONDITION AND STABILIZE, AS REQUIRED.
15. ALL DIMENSIONS INDICATED SHALL BE DETERMINED BY ACTUAL CONSTRUCTION CONDITIONS.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

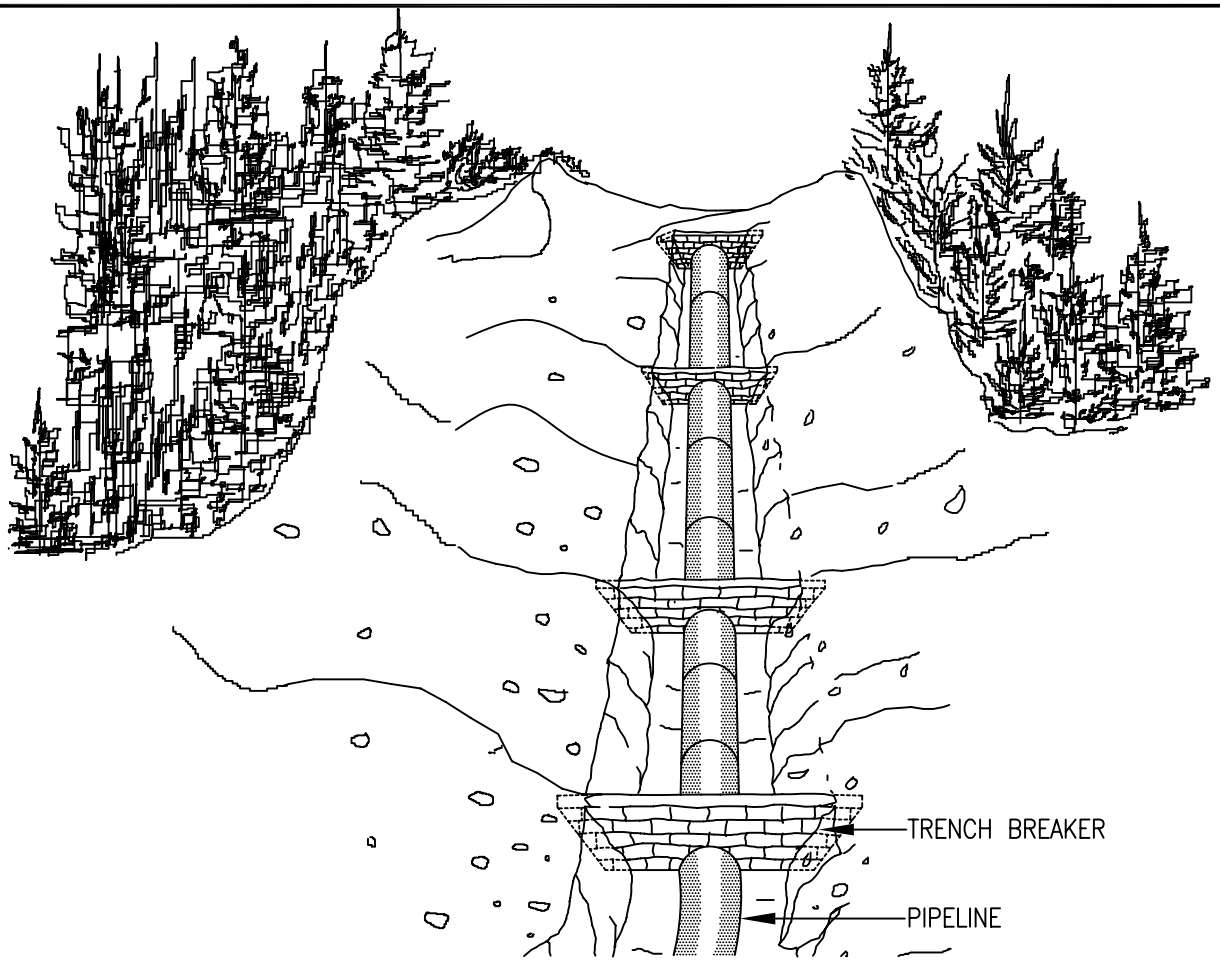
REVISIONS

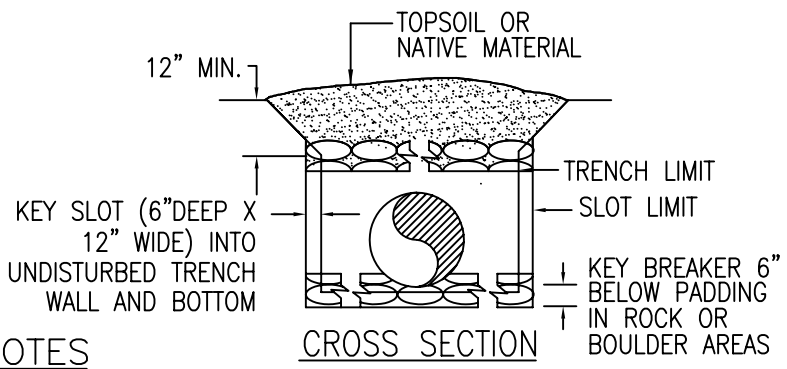
NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	03/12/04	ISSUED FOR REVIEW	RB	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

KINDER MORGAN INC

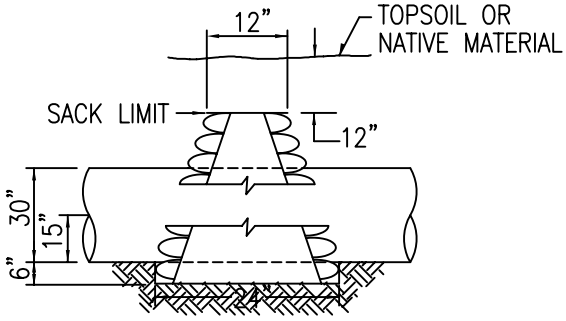
TYPICAL FLOWING WATERBODY CROSSING OPEN CUT TRENCHED

DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST-P-1150-A275	SH. 1 OF 1





CROSS SECTION



SIDE VIEW

NOTES

1. TRENCH BREAKERS SHALL BE INSTALLED:
   - ON SLOPES ALONG THE TRENCH LINE WHERE THE NATURAL DRAINAGE PATTERN, PROFILE, AND TYPE OF BACKFILL MATERIAL MAY RESULT IN LOSS OF BACKFILL MATERIAL OR ALTERATION OF THE NATURAL PATTERN;
   - AT THE BASE OF SLOPES ADJACENT TO WATERBODIES AND WETLANDS;
   - WHERE NEEDED TO AVOID DRAINING A WETLAND;
   - ON UPLAND SLOPES, AT THE SAME SPACING AS SLOPE BREAKERS AND UP SLOPE OF SLOPE BREAKERS;
   - IN CULTIVATED LAND AND RESIDENTIAL AREAS WHERE PERMANENT SLOPE BREAKERS ARE NOT TYPICALLY INSTALLED, AT THE SAME SPACING AS IF PERMANENT SLOPE BREAKERS WHERE REQUIRED.
2. BREAKERS SHALL BE INSTALLED IN ACCORDANCE WITH SECTION C1100 OF THE CONSTRUCTION STANDARDS AND AS DIRECTED
   - BY COMPANY'S INSPECTOR. SACK BREAKS SHALL UTILIZE OPEN WEAVE HEMP OR JUTE SACKS FILLED TO A MINIMUM OF 55 LBS. OF SUBSOIL, SAND OR A MIXTURE OF 1 PART CEMENT TO 6 PARTS SAND OR SUBSOIL AS DETERMINED BY COMPANY'S INSPECTOR.
   - POLYURETHANE FOAM BREAKERS MAY BE USED IN-LIEU-OF SACK BREAKERS, WHEN APPROVED BY COMPANY'S REPRESENTATIVE.
3. BREAKER SPACING AND CONFIGURATION MAY BE CHANGED AS DIRECTED BY COMPANY. DEPTH OF DITCH MAY VARY WITH SITE CONDITIONS.
4. ALL MATERIALS SHALL BE SUPPLIED BY CONTRACTOR.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

REVISIONS

NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	03/12/04	ISSUED FOR REVIEW	RB	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

KINDER MORGAN INC

TYPICAL TRENCH BREAKER

DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST-P-1260-A200	SH. 1 OF 1

STRAW MULCH

1. STRAW MULCH SHALL BE INSTALLED AT LOCATIONS IDENTIFIED ON THE CONSTRUCTION DRAWING AND/OR AS DIRECTED BY THE COMPANY'S INSPECTOR TO PROTECT SOIL FROM EROSION. AREAS TARGETED FOR STRAW MULCH INCLUDE THE FOLLOWING:
   - 10–40% SLOPES.
   - 0–10% SLOPES WITH SOILS RATED BY APPLICABLE COUNTY AS HIGH IN WIND ERODIBILITY AND LESS THAN 40% SURFACE COVER AND IF DIRECTED BY COMPANY'S INSPECTOR.

2. WHEAT, OAT, BARLEY, RYE OR FLAX STRAW WILL BE USED, WHERE APPROPRIATE, DEPENDING UPON AVAILABILITY.

3. ONLY CERTIFIED "NOXIOUS WEED–FREE" STRAW MULCH SHALL BE APPLIED UNIFORMLY OVER THE AREA TO COVER AT LEAST 75% OF THE GROUND SURFACE AT A RATE OF 2 TONS/ACRE OF STRAW, UNLESS THE LOCAL SOIL CONSERVATION AUTHORITY, LANDOWNER, OR LAND MANAGING AGENCY APPROVES OTHERWISE IN WRITING.

4. AREAS WHERE RESPREAD TOPSOIL EXHIBITS AN ADEQUATE COVER FROM RESPREAD OF PLANT DEBRIS AND COARSE FRAGMENTS, MULCH RATES MAY BE REDUCED OR ELIMINATED BY THE COMPANY'S INSPECTOR.

5. OR BONDING FIBER BLANKETS ARE ACCEPTED ALTERNATIVES PER COMPANY REPRESENTATIVES. COARSE FRAGMENTS, MULCH RATES MAY BE REDUCED OR ELIMINATED BY THE COMPANY'S INSPECTOR.

STRAW CRIMPING

1. STRAW CRIMPING WILL BE UTILIZED ON NONCULTIVATED, WIND EROSION PRONE SOILS, AND ON CULTIVATED, WATER EROSION PRONE SOILS AS IDENTIFIED ON THE ALIGNMENT SHEETS, UNLESS OTHERWISE DIRECTED BY THE COMPANY'S INSPECTOR. STRAW CRIMPING AT ADDITIONAL LOCATIONS IDENTIFIED BY THE COMPANY'S INSPECTOR MAY BE REQUIRED.

2. EQUIPMENT SPECIFICALLY DESIGNED TO CRIMP STRAW (SUCH AS A STRAW MULCH CRIMPER MANUFACTURED BY FINN CORPORATION OR AN APPROVED EQUIVALENT) SHALL BE USED TO CRIMP STRAW FIBERS TO A DEPTH OF TWO TO THREE INCHES. STEEP SLOPES INACCESSIBLE WITH A CRIMPER SHALL BE CRIMPED BY TRACKING WITH A CRAWLER RUNNING PERPENDICULAR TO THE SLOPE. DISCS SHALL NOT BE ALLOWED FOR CRIMPING EXCEPT AS STATED IN NOTE 3.

3. WHERE EXCESSIVE ROCK IS ENCOUNTERED TO THE EXTENT THAT THE SPECIALIZED CRIMPING EQUIPMENT IS NOT USEABLE, ATTEMPT TO ANCHOR THE STRAW BY INCORPORATION WITH AN AGRICULTURAL DISC OR CULTIVATOR. WHERE FROZEN GROUND CONDITIONS ARE ENCOUNTERED TO THE EXTENT THAT THE CRIMPING OPERATION IS NOT FEASIBLE, SPREAD STRAW AT DOUBLE THE NORMAL RATE.

4. CRIMP OR ANCHOR STRAW INTO THE SOIL TO AN APPROXIMATE DEPTH OF 2".

5. IN HIGHLY ERODIBLE SANDY LOCATIONS, WHERE DIRECTED BY THE COMPANY'S INSPECTOR, DOUBLE THE STRAW APPLICATION RATE AND MAKE TWO PASSES TO ANCHOR THE STRAW, ONE PASS PERPENDICULAR TO THE OTHER OR CRISS–CROSSED.

6. STRAW FOR CRIMPING WILL BE APPROVED BY COMPANY AND THE LANDOWNERS AND OCCUPANTS OR APPROPRIATE REGULATORY AUTHORITIES WHERE APPLICABLE. CRITERIA FOR THE SELECTION OF STRAW IS AS FOLLOWS:
   - THE STRAW MUST HAVE A MINIMUM FIBER LENGTH OF 8".
   - THE STRAW MUST BE FREE OF NOXIOUS OR RESTRICTED WEEDS AND UNDESIRABLE SPECIES WHICH WOULD HAMPER RECLAMATION EFFORTS.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

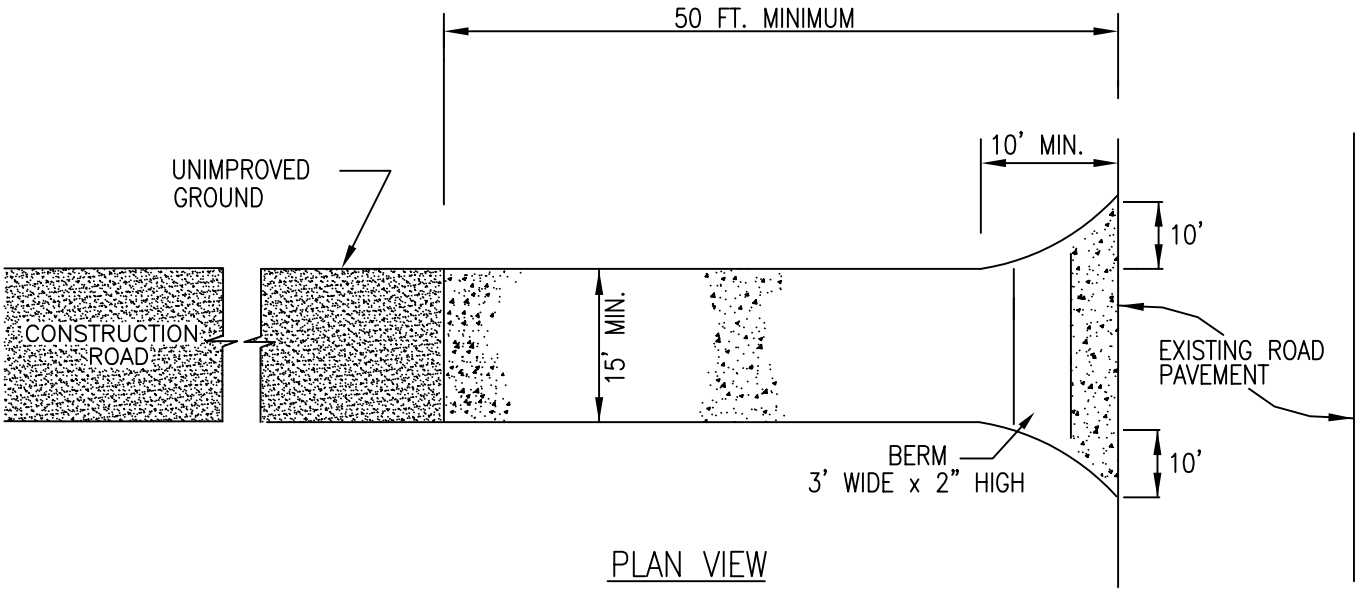
REVISIONS

NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	03/12/04	ISSUED FOR REVIEW	RB	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

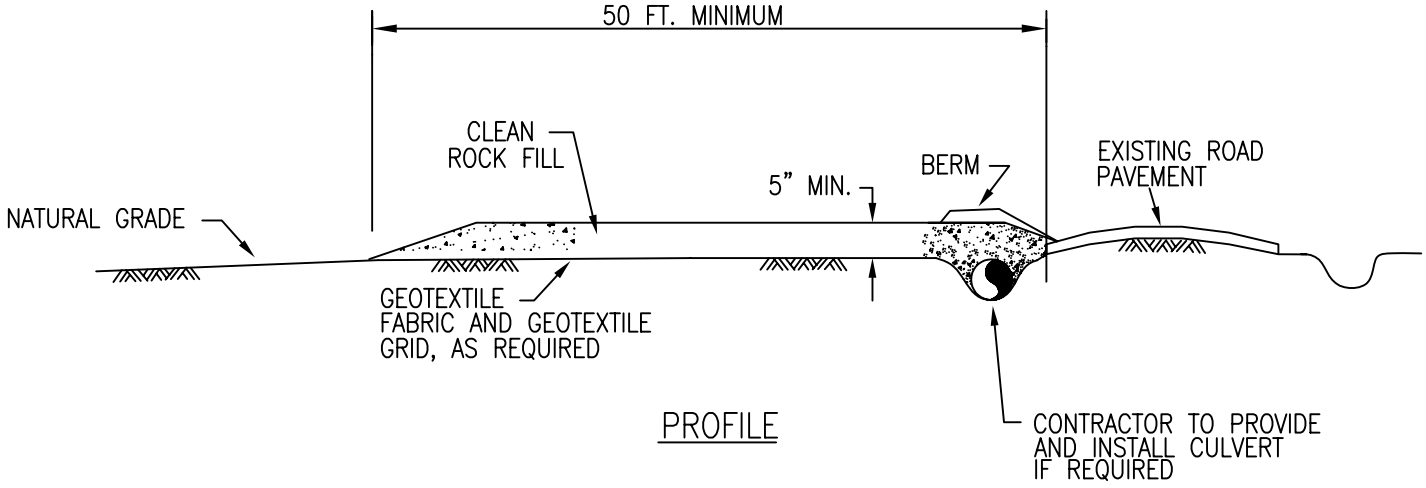
KINDER MORGAN INC

TYPICAL STRAW MULCH EROSION CONTROL

DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST–P–1260–A215	SH. 1 OF 1



PLAN VIEW



PROFILE

NOTES:

1. ACCESS PADS, AS ILLUSTRATED ABOVE, ARE TO BE INSTALLED ADJACENT TO EXISTING PAVED ROADS AT LOCATIONS IDENTIFIED ON THE CONSTRUCTION DRAWINGS OR AS DIRECTED BY THE COMPANY'S INSPECTOR.
2. IF USED IN AGRICULTURAL LAND, ROCK SHALL BE PLACED ON A GEOTEXTILE FABRIC TO FACILITATE ROCK REMOVAL.
3. SHOULD THE ROCK PAD BECOME INEFFECTIVE FOR REDUCING THE BUILDUP OF MUD AND DIRT AND MINIMIZING TRACKING ONTO THE PAVED ROAD, THE CONTRACTOR SHALL WASH THE EXISTING ROCK FILL SURFACE OR ADD A ROCK FILL LAYER TO THE ACCESS PAD.
4. CONTRACTOR SHALL KEEP PAVED ROAD SURFACES CLEAR OF MUD AND DEBRIS.
5. PRIOR TO PERMANENT SEEDING, CONTRACTOR SHALL REMOVE ALL IMPORTED ROCK FILL MATERIAL, GEOTEXTILE FABRIC AND CULVERT (IF INSTALLED) AND RESTORE THE GROUND TO NATURAL CONTOURS UNLESS OTHERWISE DIRECTED BY COMPANY'S INSPECTOR.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

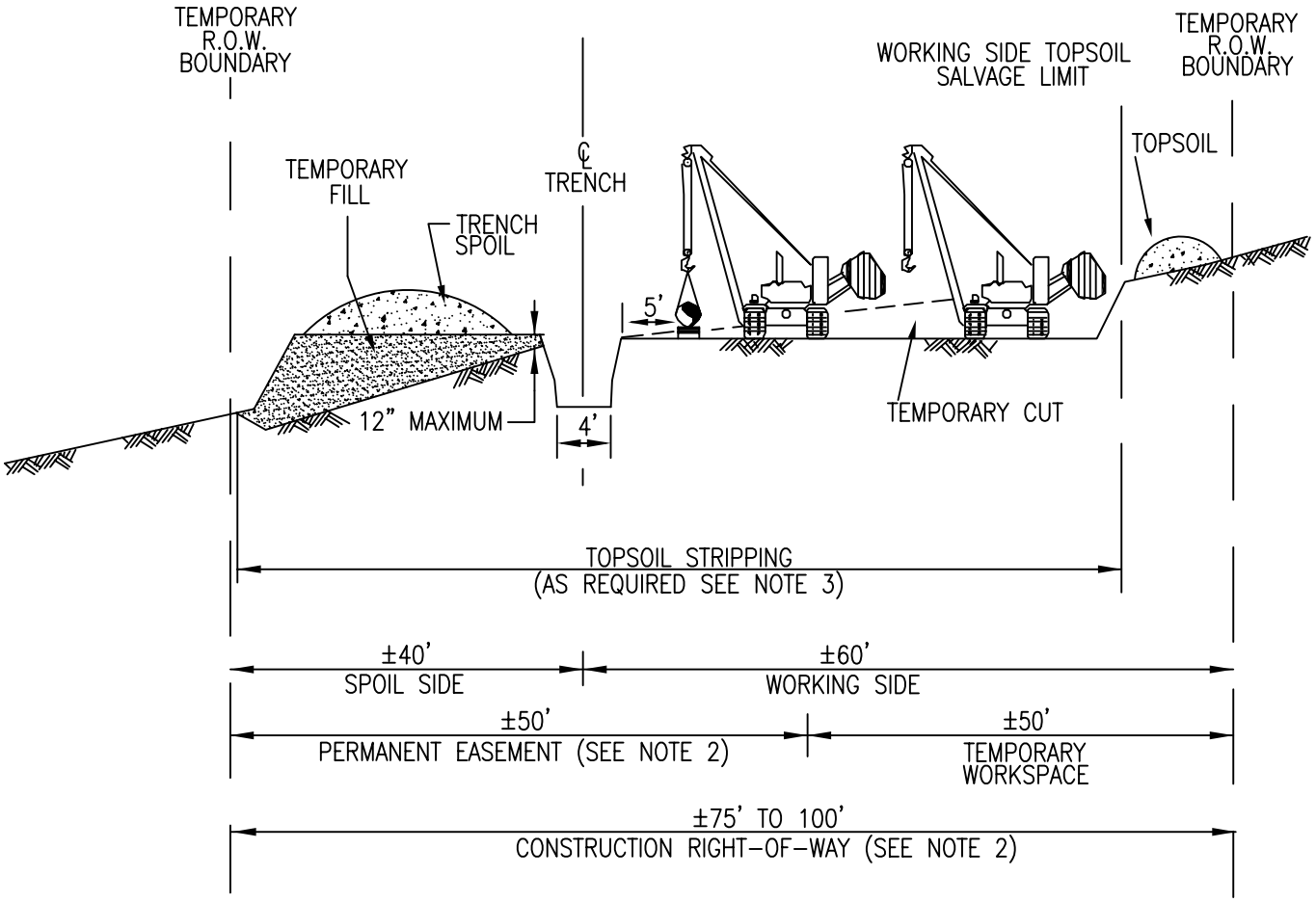
REVISIONS

NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	02/27/04	ISSUED FOR REVIEW	RB	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

KINDER MORGAN INC

TYPICAL TEMPORARY PAVED ROAD ACCESS PAD

DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST-P-1000-A145	SH. 1 OF 1



PROFILE

NOTES:

1. SIDE HILL CONSTRUCTION CUT AND FILL SHALL BE ALLOWED WHENEVER, IN THE OPINION OF THE CONTRACTOR, STEEP SIDE HILL CONSTRUCTION IS WARRANTED FOR PERSONNEL AND/OR EQUIPMENT SAFETY CONSIDERATIONS.
2. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 100 FEET WIDE CONSISTING OF 50 FEET OF PERMANENT EASEMENT AND 50 FEET OF TEMPORARY WORKSPACE. EXTRA TEMPORARY WORK SPACE WILL BE NECESSARY AT MAJOR ROAD, RAIL AND RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
3. THIS DRAWING REFLECTS "TRENCH, SPOIL, AND WORKING SIDE" TOPSOIL STRIPPING PROCEDURE AS NEEDED FOR HILL SIDE LEVELING. SALVAGE TOPSOIL OVER TRENCH UNDER THE SPOIL PILE AND FROM TEMPORARY CUT AND FILL AREAS AT LOCATIONS IDENTIFIED ON THE CONSTRUCTION ALIGNMENT SHEETS OR AS DIRECTED BY THE COMPANY'S REPRESENTATIVE.
4. STOCKPILE TOPSOIL AS SHOWN OR IN ANY CONFIGURATION APPROVED BY THE COMPANY'S REPRESENTATIVE. KEEP TOPSOIL CLEAN OF ALL CONSTRUCTION DEBRIS.
5. LEAVE GAPS IN TOPSOIL AND SPOIL PILES AT OBVIOUS DRAINAGES. DO NOT PUSH TOPSOIL INTO CREEKS OR WETLANDS. DO NOT USE TOPSOIL FOR PADDING. AVOID SCALPING VEGETATED GROUND SURFACE WHEN BACKFILLING TOPSOIL PILE.
6. TEMPORARILY SUSPEND TOPSOIL HANDLING OPERATIONS DURING INORDINATELY WINDY CONDITIONS UNTIL MITIGATIVE MEASURES TO MINIMIZE WIND EROSION CAN BE IMPLEMENTED.
7. SEE DETAILS CST-P-1260-A180.1& .2, CST-P-1260-A190.1& .2 FOR SEDIMENT BARRIER DETAIL DURING CONSTRUCTION.
8. FOR STORM WATER RUNOFF CONTROL ON HILL/SLOPE CONSTRUCTION, SEE TEMPORARY EROSION AND SEDIMENTATION CONTROL PROCEDURES IN SECTION C1260 OF THE CONSTRUCTION STANDARDS.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

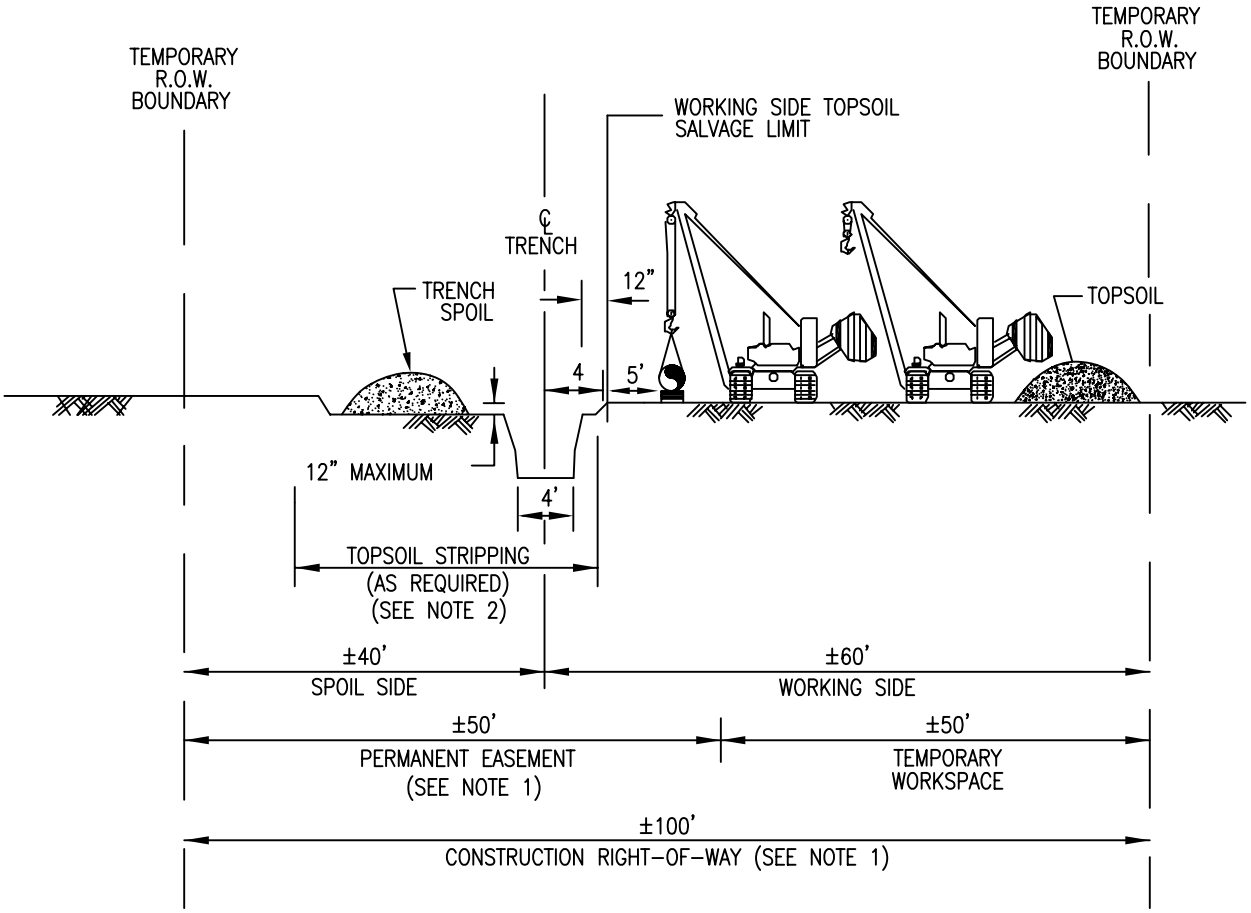
REVISIONS

NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	03/12/04	ISSUED FOR REVIEW	CF	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

KINDER MORGAN INC

TYPICAL FULL TOPSOIL
SEPARATION SIDE HILL CONSTRUCTION

DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST-P-1260-A250	SH. 1 OF 1



TYPICAL PROFILE

NOTES:

1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 100 FEET WIDE CONSISTING OF 50 FEET OF PERMANENT EASEMENT AND 50 FEET OF TEMPORARY WORKSPACE. EXTRA TEMPORARY WORK SPACE WILL BE NECESSARY AT MAJOR ROAD, RAIL AND RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. THIS DRAWING REFLECTS "TRENCH AND SPOIL SIDE" TOPSOIL STRIPPING PROCEDURE. SALVAGE TOPSOIL OVER TRENCH AND UNDER THE SPOIL PILE AT LOCATIONS IDENTIFIED ON THE CONSTRUCTION ALIGNMENT SHEETS, OR AS DIRECTED BY THE COMPANY'S REPRESENTATIVE. MINIMUM WIDTH OF TOPSOIL STRIPPING ON THE WORKING SIDE OF TRENCH IS 12 INCHES.
3. STOCKPILE TOPSOIL AS SHOWN OR IN ANY CONFIGURATION APPROVED BY THE COMPANY'S INSPECTOR. KEEP TOPSOIL CLEAN OF ALL CONSTRUCTION DEBRIS.
4. LEAVE GAPS IN TOPSOIL AND SPOIL PILES AT OBVIOUS DRAINAGES. DO NOT PUSH TOPSOIL INTO CREEKS OR WETLANDS. DO NOT USE TOPSOIL FOR PADDING. AVOID SCALPING VEGETATED GROUND SURFACE WHEN BACKFILLING TOPSOIL PILE.
5. TEMPORARILY SUSPEND TOPSOIL HANDLING OPERATIONS DURING INORDINATELY WINDY CONDITIONS UNTIL MITIGATIVE MEASURES TO MINIMIZE WIND EROSION CAN BE IMPLEMENTED.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

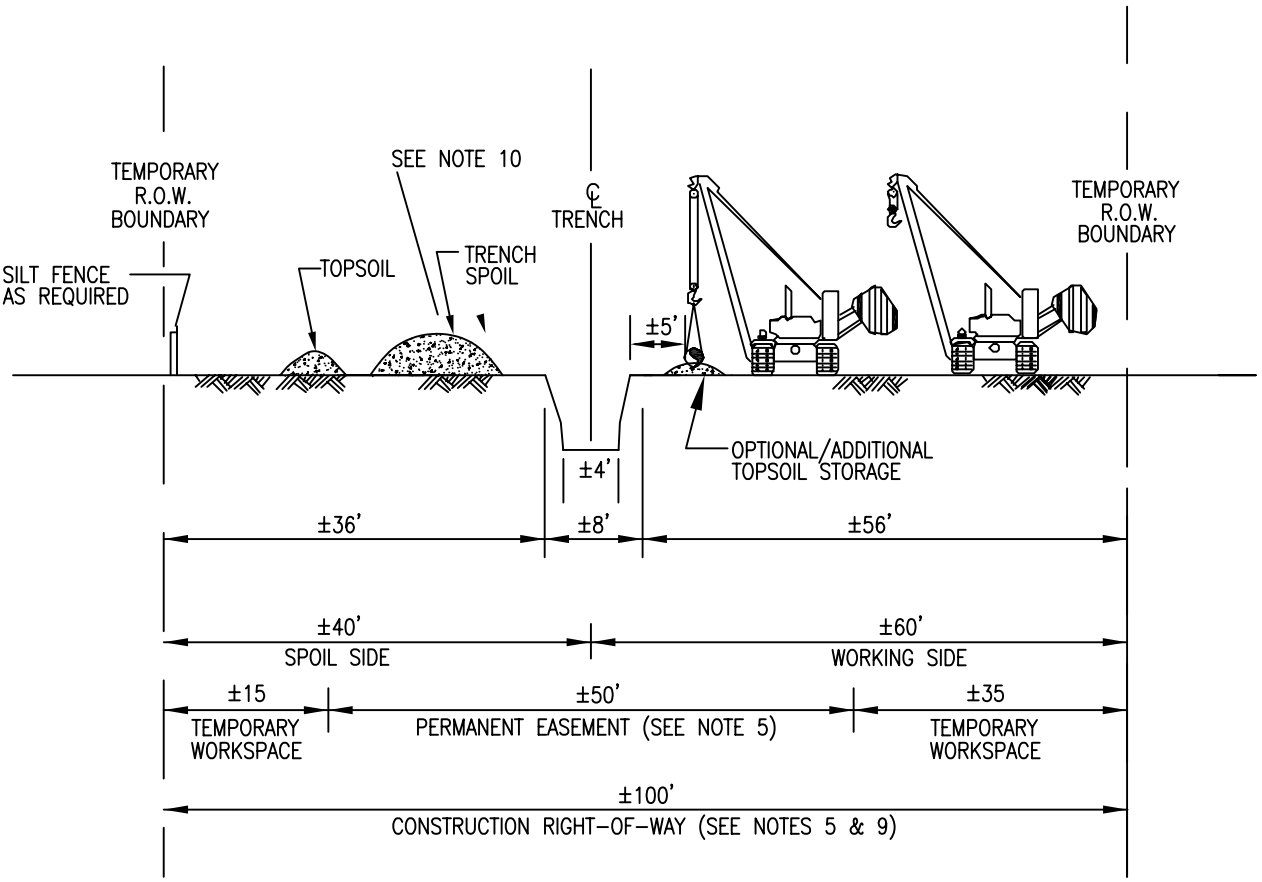
REVISIONS

NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	03/12/04	ISSUED FOR REVIEW	CF	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

KINDER MORGAN INC

TYPICAL TOPSOIL SEPARATION
TRENCH & SPOILSIDE METHOD

DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST-P-1260-A255	SH. 1 OF 1



TYPICAL PROFILE

NOTES:

1. UTILIZE THE "TRENCH ONLY" TOPSOIL SALVAGE METHOD AT LOCATIONS SUCH AS RIPARIAN AREAS OR UNMANAGED WOODLAND, WHERE IDENTIFIED ON THE CONSTRUCTION DRAWINGS, OR AS DIRECTED BY THE COMPANY'S REPRESENTATIVE.
2. THE TRENCH ONLY METHOD IS NOT TO BE USED ON AGRICULTURAL LAND EXCEPT AS DIRECTED BY THE KM INSPECTOR (PER LANDOWNER REQUEST).
3. FOR TRENCH ONLY STRIPPING, THE STRIPPED AREA SHALL BE WIDE ENOUGH TO ACCOMMODATE TRENCHING EQUIPMENT.
4. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 100 FEET WIDE CONSISTING OF 50 FEET OF PERMANENT EASEMENT AND 50 FEET OF TEMPORARY WORKSPACE. EXTRA TEMPORARY WORK SPACE WILL BE NECESSARY AT MAJOR ROAD, RAIL AND RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
5. STOCKPILE TOPSOIL AS SHOWN OR IN ANY CONFIGURATION APPROVED BY THE COMPANY'S INSPECTOR. KEEP TOPSOIL CLEAN OF ALL CONSTRUCTION DEBRIS.
6. LEAVE GAPS IN TOPSOIL AND SPOIL PILES AT OBVIOUS DRAINAGES. DO NOT PUSH TOPSOIL INTO CREEKS OR WETLANDS. DO NOT USE TOPSOIL FOR PADDING.
7. AVOID SCALPING VEGETATED GROUND SURFACE WHEN BACKFILLING SPOIL AND TOPSOIL PILES.
8. SAME LAYOUT APPLIES WHERE CONSTRUCTION R.O.W. DOES NOT ABUT EXISTING R.O.W.
9. TEMPORARILY SUSPEND TOPSOIL HANDLING OPERATIONS DURING INORDINATELY WINDY CONDITIONS UNTIL MITIGATIVE MEASURES TO MINIMIZE WIND EROSION CAN BE IMPLEMENTED.
10. TOPSOIL AND TRENCH SPOIL RELATIVE POSITIONS CAN, AS DIRECTED BY THE COMPANY'S INSPECTOR, BE REVERSED.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

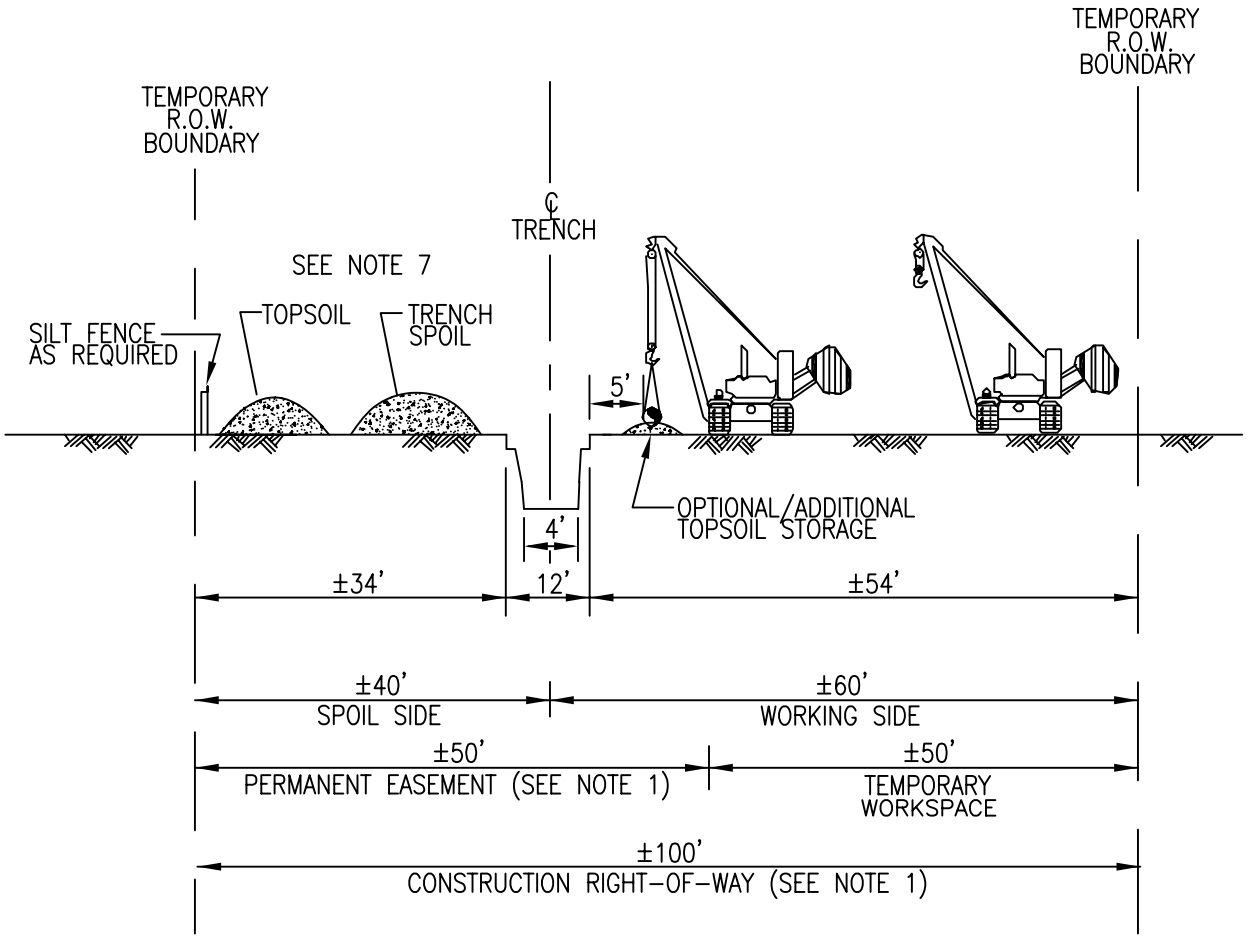
REVISIONS

NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	03/12/04	ISSUED FOR REVIEW	CF	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

KINDER MORGAN INC

TYPICAL TOPSOIL SEPARATION
TRENCH PLUS 4' METHOD

DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST-P-1260-A260	SH. 1 OF 1



TYPICAL PROFILE

NOTES:

1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 100 FEET WIDE CONSISTING OF 50 FEET OF PERMANENT EASEMENT AND 50 FEET OF TEMPORARY WORKSPACE. EXTRA TEMPORARY WORK SPACE WILL BE NECESSARY AT MAJOR ROAD, RAIL AND RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. UTILIZE THE "BLADE WIDTH" TOPSOIL SALVAGE METHOD AT LOCATIONS SUCH AS RIPARIAN AREAS OR UNMANAGED WOODLANDS, WHERE IDENTIFIED ON THE CONSTRUCTION DRAWINGS, OR AS DIRECTED BY THE COMPANY'S INSPECTOR. THE BLADE WIDTH METHOD IS NOT TO BE USED IN AGRICULTURAL LANDS, EXCEPT AS DIRECTED BY THE COMPANY'S INSPECTOR (PER LANDOWNER REQUEST.) FOR BLADE WIDTH STRIPPING, THE STRIPPED AREA SHALL BE WIDE ENOUGH TO ACCOMMODATE TRENCHING EQUIPMENT.
3. STOCKPILE TOPSOIL AS SHOWN OR IN ANY CONFIGURATION APPROVED BY THE COMPANY'S INSPECTOR. KEEP TOPSOIL CLEAN OF ALL CONSTRUCTION DEBRIS. MAINTAIN SEPARATION BETWEEN TOPSOIL AND SUBSOIL PILES.
4. LEAVE GAPS IN TOPSOIL AND SPOIL PILES AT OBVIOUS DRAINAGES. DO NOT PUSH TOPSOIL INTO CREEKS OR WETLANDS. DO NOT USE TOPSOIL FOR PADDING.
5. TEMPORARILY SUSPEND TOPSOIL HANDLING DURING INORDINATELY WINDY CONDITIONS UNTIL MITIGATIVE MEASURES TO MINIMIZE WIND EROSION CAN BE IMPLEMENTED.
6. AVOID SCALPING VEGETATED GROUND SURFACE WHEN BACKFILLING SPOIL AND TOPSOIL PILES.
7. TOPSOIL AND TRENCH SPOIL RELATIVE POSITIONS CAN, AS DIRECTED BY THE COMPANY'S REPRESENTATIVE, BE REVERSED.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

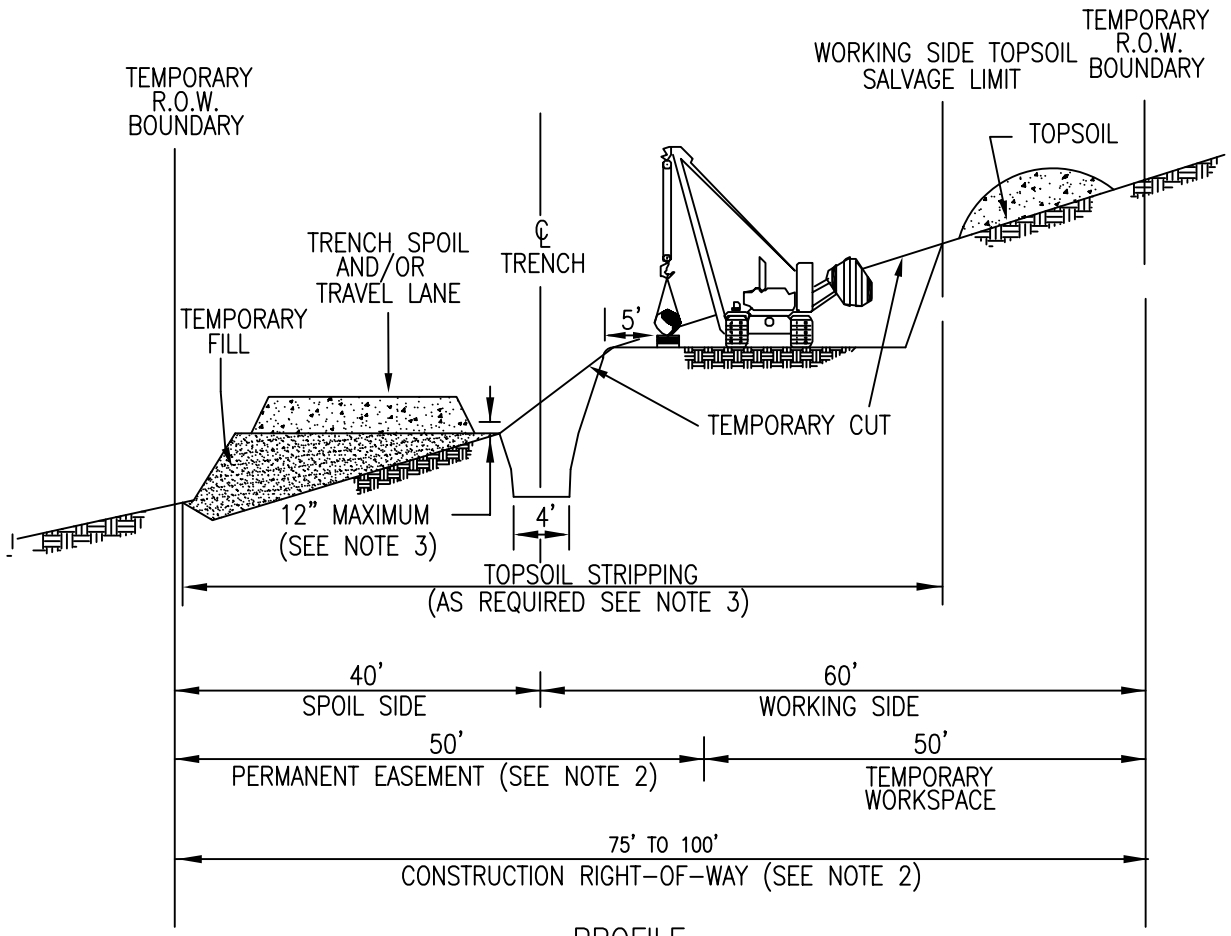
REVISIONS

NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	03/12/04	ISSUED FOR REVIEW	CF	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/0	ENG REWRITE RELEASE	WS		

KINDER MORGAN INC

TYPICAL TOPSOIL
SEPARATION BLADE WIDTH

DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST-P-1260-A265	SH. 1 OF 1



PROFILE

NOTES:

1. SIDE HILL CONSTRUCTION CUT AND FILL SHALL BE ALLOWED WHENEVER, IN THE OPINION OF THE CONTRACTOR, STEEP SIDE HILL CONSTRUCTION IS WARRANTED FOR PERSONNEL AND/OR EQUIPMENT SAFETY CONSIDERATIONS.
2. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 100 FEET WIDE CONSISTING OF 50 FEET OF PERMANENT EASEMENT AND 50 FEET OF TEMPORARY WORKSPACE. EXTRA TEMPORARY WORK SPACE WILL BE NECESSARY AT MAJOR ROAD, RAIL AND RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
3. THIS DRAWING REFLECTS "TRENCH, SPOIL, AND WORKING SIDE" TOPSOIL STRIPPING PROCEDURE AS NEEDED FOR HILL SIDE LEVELING. SALVAGE TOPSOIL OVER TRENCH UNDER THE SPOIL PILE AND FROM TEMPORARY CUT AND FILL AREAS AT LOCATIONS IDENTIFIED ON THE CONSTRUCTION ALIGNMENT SHEETS OR AS DIRECTED BY THE COMPANY'S INSPECTOR.
4. STOCKPILE TOPSOIL AS SHOWN OR IN ANY CONFIGURATION APPROVED BY THE COMPANY'S REPRESENTATIVE. KEEP TOPSOIL CLEAN OF ALL CONSTRUCTION DEBRIS.
5. LEAVE GAPS IN TOPSOIL AND SPOIL PILES AT OBVIOUS DRAINAGES. DO NOT PUSH TOPSOIL INTO CREEKS OR WETLANDS. DO NOT USE TOPSOIL FOR PADDING. AVOID SCALPING VEGETATED GROUND SURFACE WHEN BACKFILLING TOPSOIL PILE.
6. TEMPORARILY SUSPEND TOPSOIL HANDLING OPERATIONS DURING INORDINATELY WINDY CONDITIONS UNTIL MITIGATIVE MEASURES TO MINIMIZE WIND EROSION CAN BE IMPLEMENTED.
7. SEE CST-P-1260-A180.1 & .2, CST-P-1260-A190.1 & .2. FOR SEDIMENT BARRIER DETAIL DURING CONSTRUCTION.
8. FOR STORM WATER RUNOFF CONTROL ON HILL/SLOPE CONSTRUCTION, SEE TEMPORARY EROSION AND SEDIMENTATION CONTROL PROCEDURES IN SECTION C1260 OF THE CONSTRUCTION STANDARDS.
9. ALL DIMENSIONS INDICATED SHALL BE DETERMINED BY ACTUAL CONSTRUCTION CONDITIONS.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

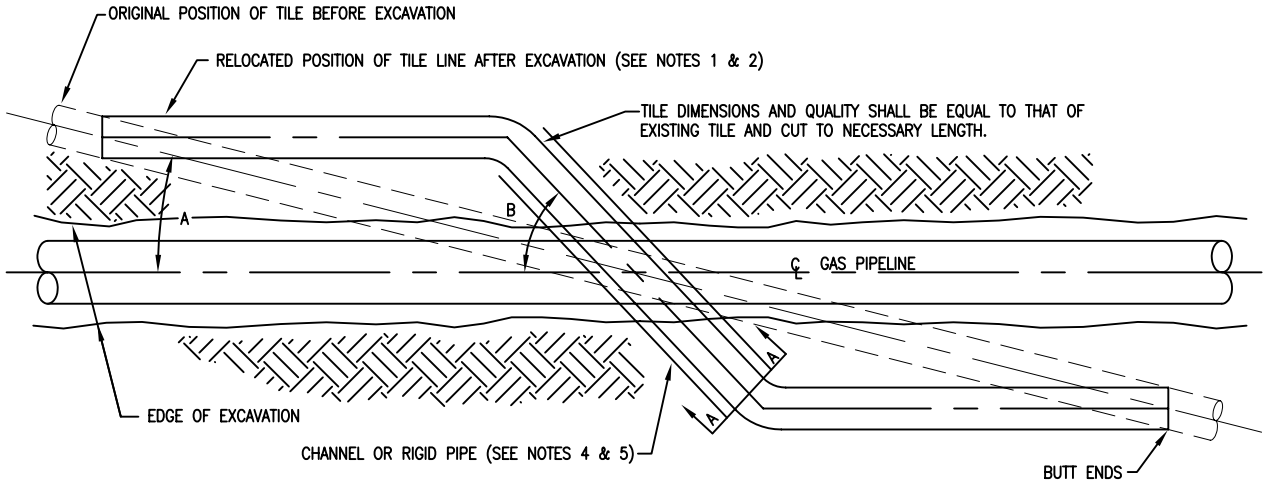
REVISIONS

NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	03/12/04	ISSUED FOR REVIEW	RB	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

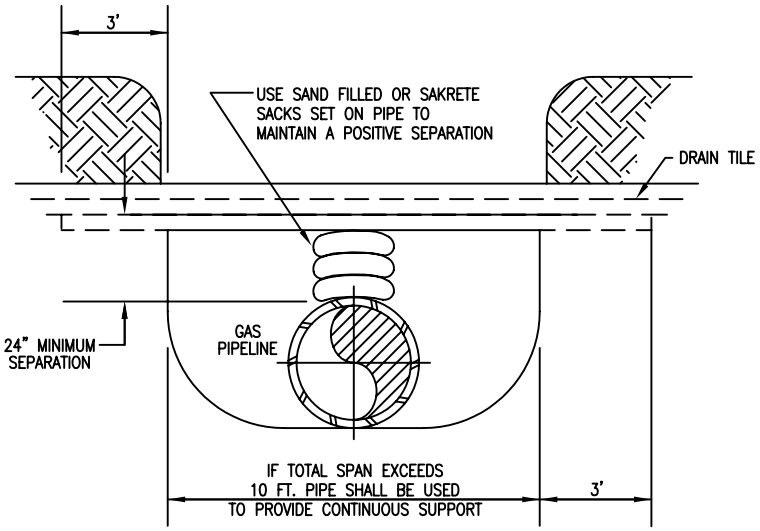
KINDER MORGAN INC

TYPICAL FULL
TOPSOIL SEPARATION SIDE HILL
CONSTRUCTION SPOILSIDE TRAVEL LANE

DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST-P-1260-A270	SH. 1 OF 1

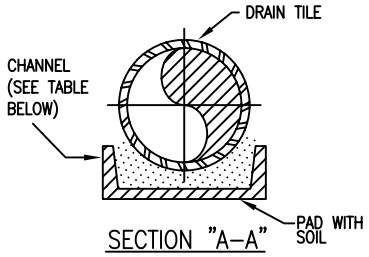


PLAN VIEW



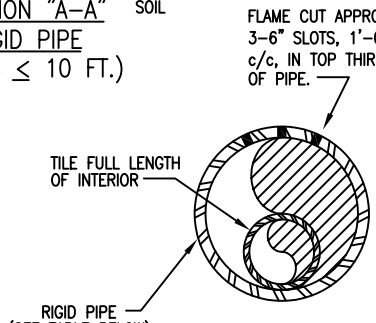
* 3'-0" MIN. LENGTH OF CHANNEL OR RIGID PIPE SUPPORTED BY UNDISTURBED SOIL IF CROSSING IS NOT AT RIGHT ANGLES TO GAS PIPELINE, EQUIVALENT LENGTH PERPENDICULAR TO TRENCH.

* PROVIDE CONTINUOUS FIRM SUPPORT.



SECTION "A-A"
RIGID PIPE
(SPANS ≤ 10 FT.)

END VIEWS



SECTION "A-A"
RIGID PIPE
(SPANS > 10 FT.)

NOTES:

1. TILE REPAIR SHALL MAINTAIN ORIGINAL ALIGNMENT AND GRADIENT WHEN ANGLE "A" BETWEEN PIPELINE AND ORIGINAL TILE, IS MORE THEN 20° UNLESS OTHERWISE DIRECTED BY KINDER MORGAN REPRESENTATIVE.
2. WHEN ANGLE "A" IS LESS THAN 20°. UNLESS OTHERWISE DIRECTED BY COMPANY, ANGLE "B" SHALL BE 45° FOR USUAL WIDTHS OF TRENCH FOR EXTRA WIDTHS IT MAY BE GREATER AS DIRECTED BY KINDER MORGAN REPRESENTATIVE.
3. DRAINAGE TILE SHALL BE REPLACED SO THAT ITS FORMER GRADIENT AND ALIGNMENT IS RESTORED.
4. DIAMETER OF RIGID PIPE SHALL BE ADEQUATE SIZE TO ALLOW FOR THE INSTALLATION OF THE TILE FOR THE FULL LENGTH OF RIGID PIPE.
5. OTHER METHODS OF SUPPORTING DRAIN TILE MAY BE USED IF THE ALTERNATE PROPOSED IS EQUIVALENT IN STRENGTH TO THE CHANNEL/PIPE SECTIONS SHOWN AND IF APPROVED BY THE KINDER MORGAN REPRESENTATIVE IN ADVANCE. SITE SPECIFIC ALTERNATE SUPPORT SYSTEM TO BE DEVELOPED BY COMPANY REPRESENTATIVE AND FURNISHED TO CONTRACTOR FOR SPANS IN ACCESS OF 20 FT. TILE GREATER THAN 10" IN DIAMETER AND FOR "HEADER" SYSTEMS.
6. ALL MATERIAL TO FURNISHED BY CONTRACTOR.
7. PRIOR TO REPAIRING TILE, CONTRACTOR SHALL PROBE INTO THE EXISTING TILE TO THE FULL WIDTH OF THE RIGHT OF WAY TO DETERMINE IF ADDITIONAL DAMAGE HAS OCCURRED. ALL DAMAGED/DISTURBED TILE SHALL BE REPAIRED AS NEAR AS PRACTICAL TO ITS ORIGINAL CONDITION.
8. "NIGHT CAP"

MINIMUM SUPPORT TABLE		
TILE SIZE	CHANNEL SIZE	PIPE SIZE
3"	4" @ 5.4 #/FT.	STD. WT.
4"-5"	5" @ 6.7 #/FT.	STD. WT.
6"-9"	7" @ 9.8 #/FT.	STD. WT.
10"	10" @ 15.3 #/FT.	STD. WT.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

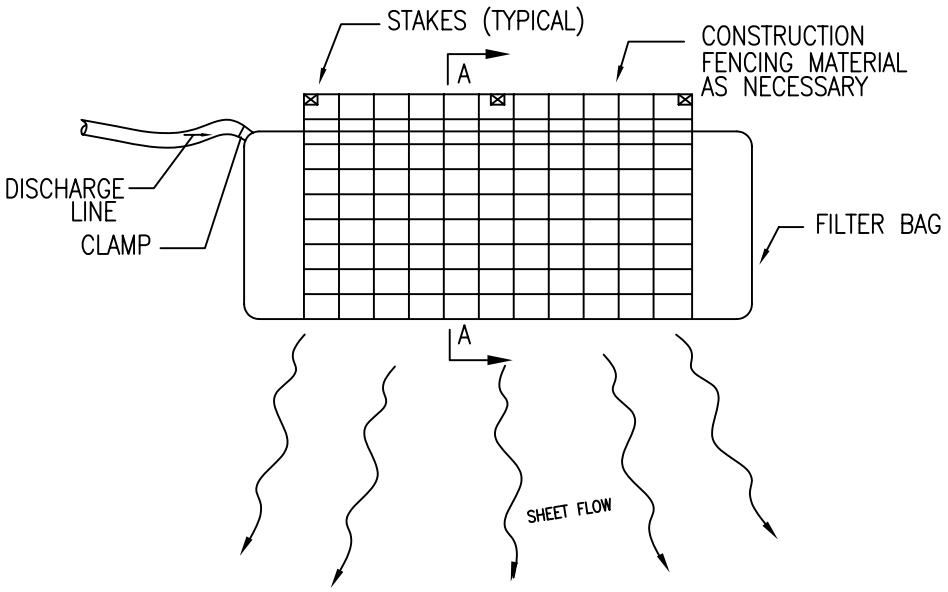
REVISIONS

NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	03/16/04	ISSUED FOR REVIEW	CF	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		
4	8/8/08	ENG REWRITE RELEASE	CWP	JT	

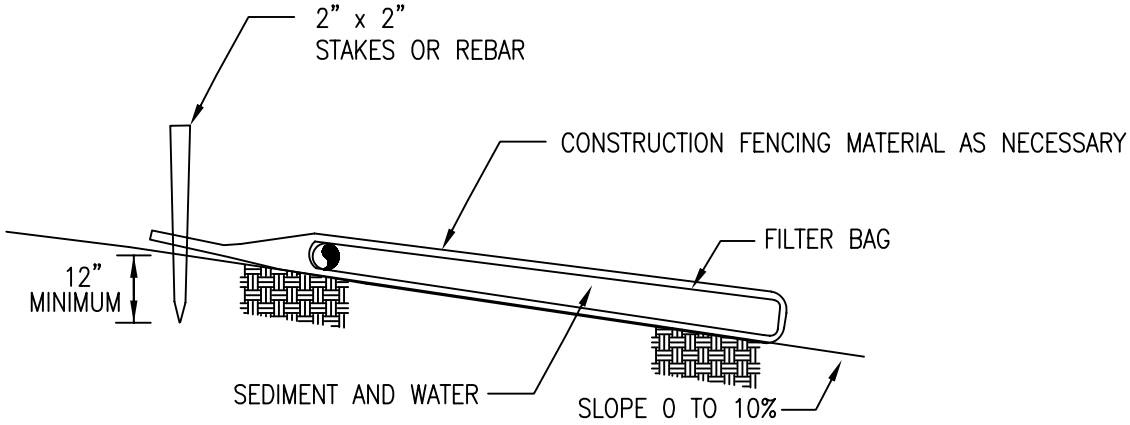
KINDER MORGAN

TYPICAL UNDERCROSSING OF TILE DRAINLINES

DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST-P-1000-A305	SH. 1 OF 1



PLAN



SECTION "A–A"

NOTES:

1. INSTALL A DEWATERING GEOTEXTILE FILTER BAG AS DIRECTED BY THE COMPANY'S INSPECTOR TO PREVENT THE FLOW OF HEAVILY SILT LADEN WATER INTO WATERBODIES OR WETLANDS.
2. DISCHARGE SITE SHALL BE WELL VEGETATED AND THE TOPOGRAPHY OF THE SITE SUCH THAT WATER WILL FLOW AWAY FROM ANY WORK AREAS. THE AREA DOWN SLOPE FROM THE DEWATERING SITE MUST BE REASONABLY PLANE OR STABILIZED BY VEGETATION OR OTHER MEANS TO ALLOW THE FILTERED WATER TO CONTINUE AS SHEET FLOW.
3. TO ATTACH THE DISCHARGE HOSE, CUT A CORNER OF THE BAG, INSERT DISCHARGE HOSE, AND SECURE THE HOSE TO THE BAG.
4. A SINGLE FILTER BAG SHOULD NOT BE USED FOR FLOWS GREATER THAN 600 GALLONS PER MINUTE.
5. REPLACE FILTER BAG BEFORE IT IS COMPLETELY FILLED WITH SEDIMENT. MONITOR DISCHARGE TO AVOID OVER PRESSURING DUE TO PLUGGING, WHICH MAY RESULT IN RUPTURE.
6. DISPOSE OF USED FILTER BAG AND SEDIMENT AT A SITE APPROVED BY THE COMPANY'S INSPECTOR.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

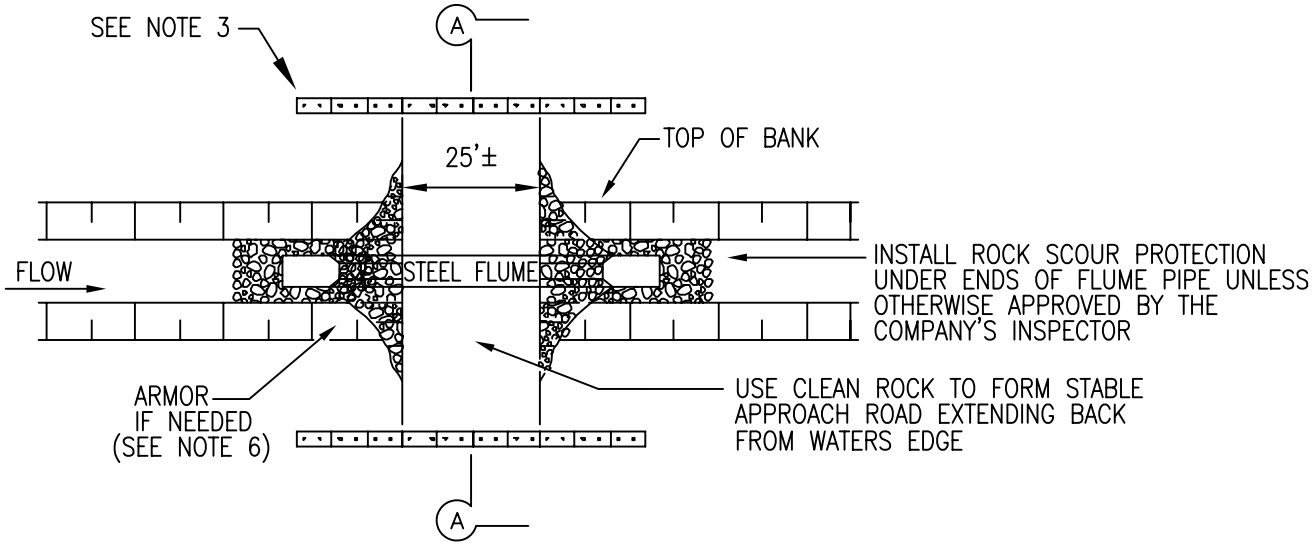
REVISIONS

NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	02/27/04	ISSUED FOR REVIEW	RB	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

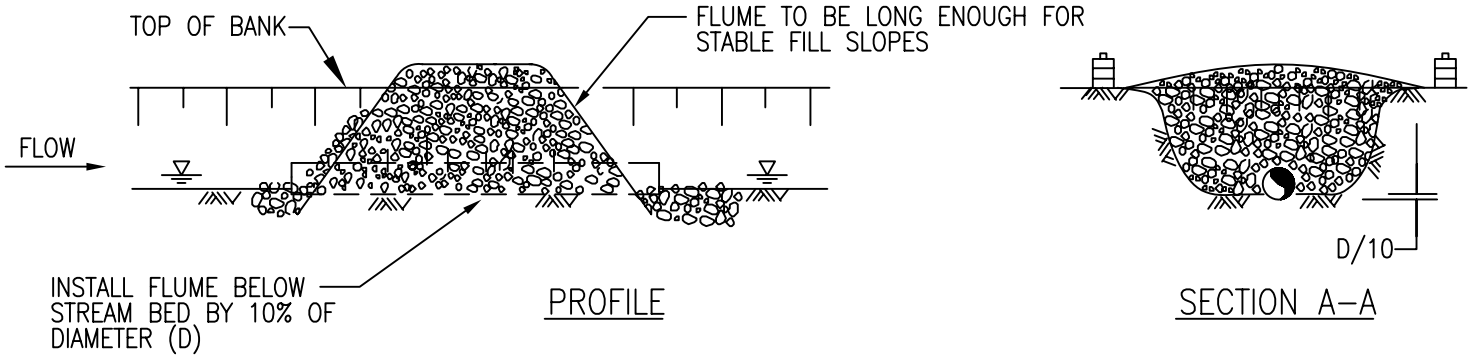
KINDER MORGAN INC

TYPICAL GEOTEXTILE FILTER BAG FOR DEWATERING

DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST–P–1000–A165	SH. 1 OF 1



PLAN VIEW



PROFILE

SECTION A–A

NOTES:

1. THIS FIGURE APPLIES ONLY TO MINOR WATERBODIES WITH STATE DESIGNATED FISHERIES CLASSIFICATIONS, AND INTERMEDIATE WATERBODIES ONLY APPLICABLE WHERE PERMIT ALLOWS.
2. UTILIZE APPROACH FILLS OF CLEAN GRANULAR MATERIAL, SWAMP MATS, SKIDS, OR OTHER SUITABLE MATERIALS TO AVOID CUTTING THE BANKS WHEREVER FEASIBLE. ENSURE ADEQUATE FLUME CAPACITY.
3. CONSTRUCT SEDIMENT BARRIERS ACROSS THE ENTIRE CONSTRUCTION R.O.W. TO PREVENT SILT LADEN WATER AND SPOIL FROM FLOWING BACK INTO WATERBODY. BARRIERS MAY BE TEMPORARILY REMOVED TO ALLOW CONSTRUCTION ACTIVITIES BUT MUST BE REPLACED BY THE END OF EACH WORK DAY. SILT FENCE, HAY BALES OR SAND BAGS MAY BE USED INTERCHANGEABLY.
4. INSTALL A STEEL FLUME PIPE AND PROVIDE A MINIMUM OF 12" OF COVER OR 1/3 DIAMETER FOR FLUMES > 36" IN DIAMETER.
5. CREATE OVERFLOW AREA TO ACCOMMODATE FLASH FLOOD EVENTS IF POSSIBLE.
6. ARMOR THE INLET AND/OR OUTLET WITH LARGER ROCK OR OTHER SUITABLE MATERIAL WHERE REQUIRED BY THE COMPANY'S REPRESENTATIVE.
7. REMOVE ROCKFILL AND FLUME AS SOON AS POSSIBLE AFTER PERMANENT SEEDING UNLESS OTHERWISE DIRECTED BY COMPANY REPRESENTATIVE. THE STRUCTURE IS TO BE REMOVED IF THERE IS MORE THAN ONE MONTH BETWEEN FINAL GRADING AND SEEDING, AND ALTERNATIVE ACCESS TO THE CONSTRUCTION R.O.W. IS AVAILABLE.
8. RESTORE AND STABILIZE BED AND BANKS TO APPROXIMATE PRE–CONSTRUCTION CONDITIONS.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

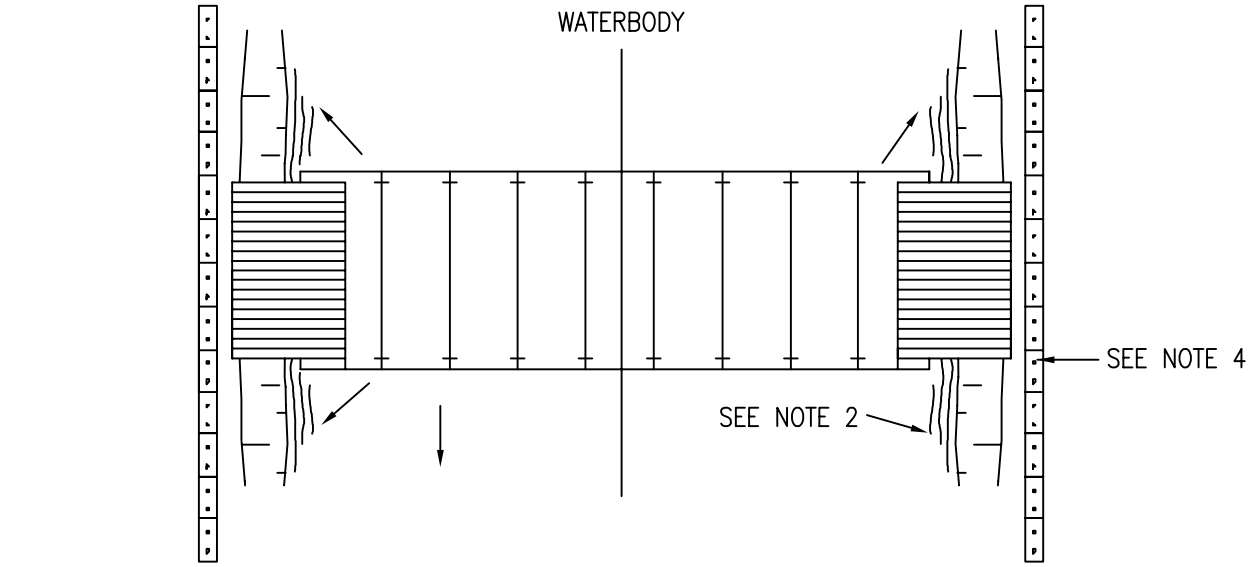
REVISIONS

NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	03/15/04	ISSUED FOR REVIEW	RB	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

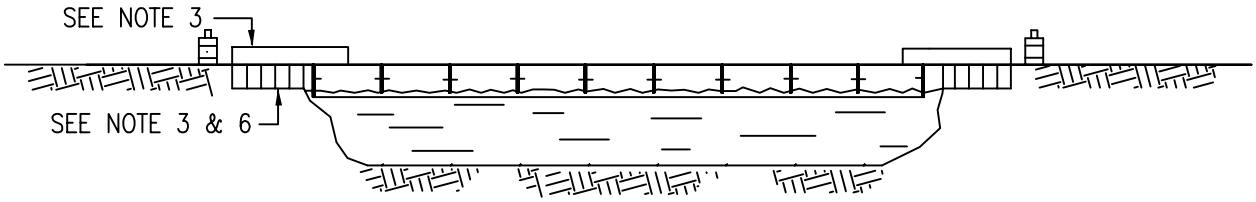
KINDER MORGAN INC

TYPICAL WATERBODY
BRIDGE ROCKFILL & FLUME

DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST–P–1000–A335	SH. 1 OF 1



PLAN



PROFILE

NOTES:

1. THIS TYPE OF BRIDGE IS GENERALLY USED ON WIDE, DEEP CROSSINGS.
2. BRIDGE IS ANCHORED AND/OR TIED OFF TO ANCHOR BLOCKS FOR STABILITY.
3. UTILIZE APPROACH FILLS OF CLEAN GRANULAR MATERIAL, SWAMP MATS, SKIDS OR OTHER SUITABLE MATERIALS TO AVOID CUTTING THE BANKS WHEREVER FEASIBLE. ENSURE ADEQUATE FREEBOARD. AS REQUIRED, ENSURE THAT FILL MATERIAL, IF USED, DOES NOT SPILL INTO WATERCOURSE.
4. CONSTRUCT SEDIMENT BARRIERS ACROSS THE ENTIRE CONSTRUCTION R.O.W. TO PREVENT SILT LADEN WATER AND SPOIL FROM FLOWING BACK INTO WATERBODY. BARRIERS MAY BE TEMPORARILY REMOVED TO ALLOW CONSTRUCTION ACTIVITIES BUT MUST BE REPLACED BY THE END OF EACH WORK DAY. SILT FENCE, HAY BALES OR SANDBAGS MAY BE USED INTERCHANGEABLY.
5. REMOVE FLOATING BRIDGES AS SOON AS POSSIBLE AFTER PERMANENT SEEDING UNLESS OTHERWISE DIRECTED BY COMPANY REPRESENTATIVE. THE STRUCTURE IS TO BE REMOVED IF THERE IS MORE THAN ONE MONTH BETWEEN FINAL GRADING AND SEEDING AND ALTERNATIVE ACCESS TO THE CONSTRUCTION R.O.W. IS AVAILABLE.
6. DISPOSE OF ANY ROCK AS DIRECTED BY COMPANY REPRESENTATIVE.
7. RESTORE AND STABILIZE BED AND BANKS TO APPROXIMATE PRE-CONSTRUCTION CONDITIONS.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

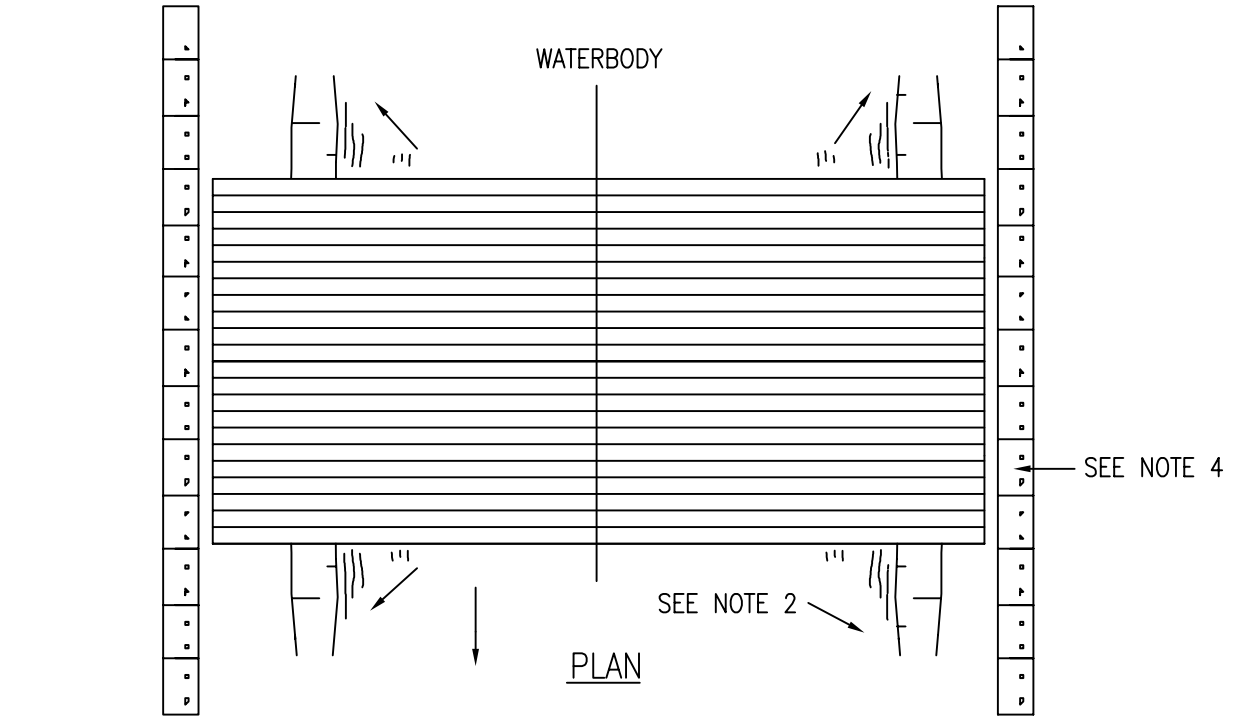
REVISIONS

NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	03/15/04	ISSUED FOR REVIEW	RB	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

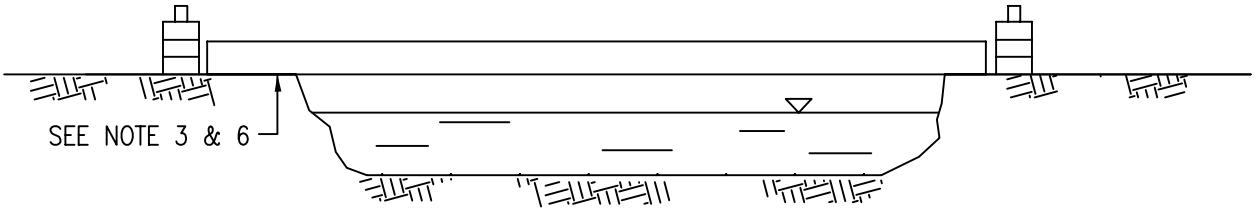
KINDER MORGAN INC

TYPICAL FLEXI-FLOAT WATERBODY BRIDGE

DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST-P-1000-A355	SH. 1 OF 1



PLAN



PROFILE

NOTES:

1. THIS TYPE OF BRIDGE IS GENERALLY USED ON NARROW CROSSINGS, LESS THAN 20 FEET WIDE WITH APPROPRIATE BANK CONFIGURATION. MULTIPLE MATS MAY BE LAYERED FOR HEAVIER EQUIPMENT CROSSINGS.
2. BRIDGE IS ANCHORED AND/OR TIED OFF TO ANCHOR BLOCKS FOR STABILITY. BRIDGE SHOULD BE TEMPORARILY REMOVED IF HIGH WATER RENDERS IT UNSAFE TO USE.
3. IF REQUIRED, UTILIZE APPROACH FILLS OF CLEAN GRANULAR MATERIAL, SWAMP MATS, SKIDS OR OTHER SUITABLE MATERIALS TO AVOID CUTTING THE BANKS WHEREVER FEASIBLE. ENSURE ADEQUATE FREEBOARD. AS REQUIRED, ENSURE THAT FILL MATERIAL IF USED DOES NOT SPILL INTO WATERCOURSE INCLUDING REMOVAL OF DIRT FROM DECK DURING OPERATION.
4. CONSTRUCT SEDIMENT BARRIERS ACROSS THE ENTIRE CONSTRUCTION R.O.W. TO PREVENT SILT LADEN WATER AND SPOIL FROM FLOWING BACK INTO WATERBODY. BARRIERS MAY BE TEMPORARILY REMOVED TO ALLOW CONSTRUCTION ACTIVITIES BUT MUST BE REPLACED BY THE END OF EACH WORK DAY. SILT FENCE, HAY BALES OR SANDBAGS MAY BE USED INTERCHANGEABLY.
5. REMOVE BRIDGES AS SOON AS POSSIBLE AFTER PERMANENT SEEDING UNLESS OTHERWISE DIRECTED BY COMPANY REPRESENTATIVE. THE STRUCTURE IS TO BE REMOVED IF THERE IS MORE THAN ONE MONTH BETWEEN FINAL GRADING AND SEEDING, AND ALTERNATIVE ACCESS TO THE CONSTRUCTION R.O.W. IS AVAILABLE.
6. DISPOSE OF ANY ROCK AS DIRECTED BY COMPANY REPRESENTATIVE.
7. RESTORE AND STABILIZE BED AND BANKS TO APPROXIMATE PRE-CONSTRUCTION CONDITIONS.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

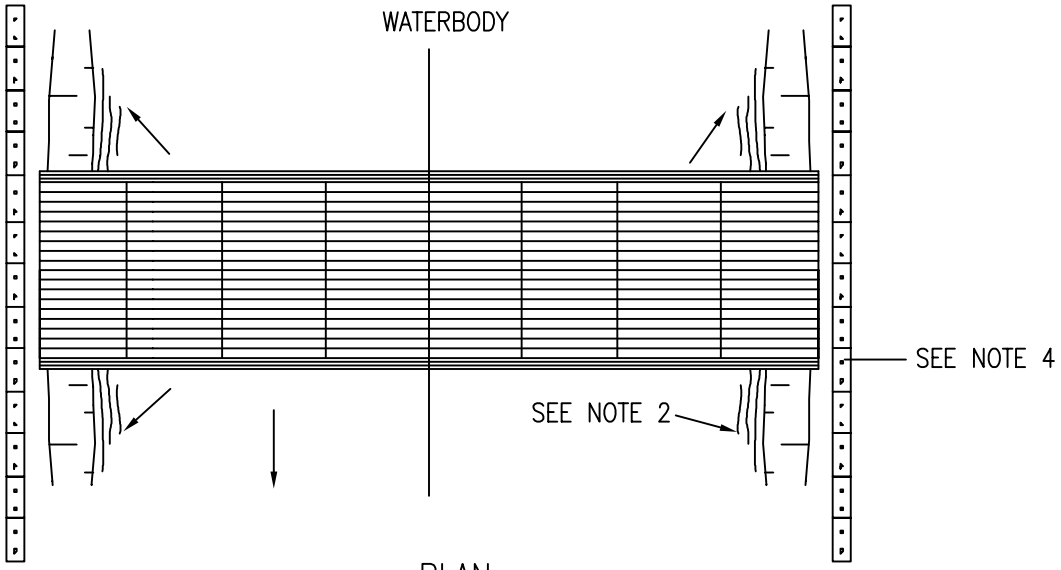
REVISIONS

NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	03/15/04	ISSUED FOR REVIEW	RB	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

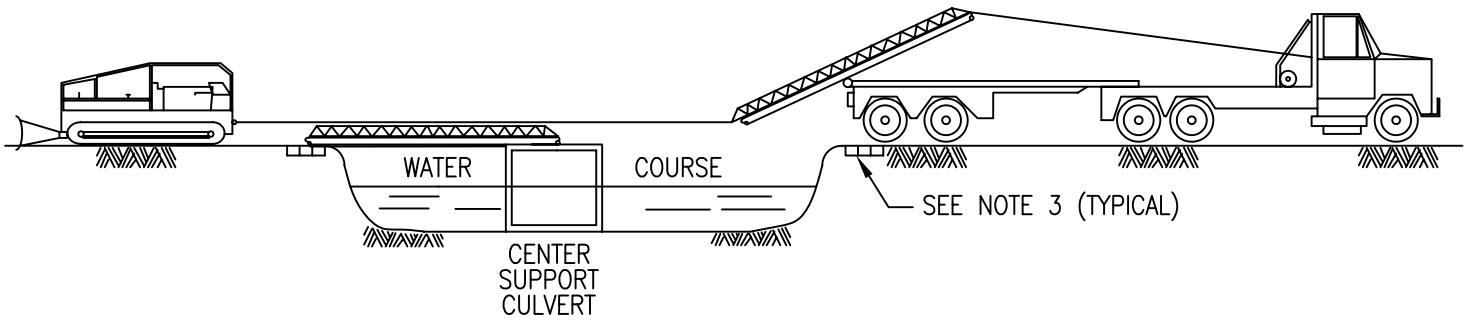
KINDER MORGAN INC

TYPICAL TIMBER MAT
WATERBODY BRIDGE

DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST-P-1000-A350	SH. 1 OF 1



PLAN



PROFILE

NOTES:

1. THIS TYPE OF BRIDGE IS GENERALLY USED FOR CROSSINGS THAT ARE TOO WIDE FOR A SINGLE BRIDGE SECTION AND RELATIVELY SHALLOW.
2. BRIDGE IS ANCHORED AND/OR TIED OFF TO ANCHOR BLOCKS FOR STABILITY.
3. UTILIZE APPROACH FILLS OF CLEAN GRANULAR MATERIAL, SWAMP MATS, SKIDS OR OTHER SUITABLE MATERIALS TO AVOID CUTTING THE BANKS WHEREVER FEASIBLE. ENSURE ADEQUATE FREEBOARD. AS REQUIRED, ENSURE THAT FILL MATERIAL, IF USED, DOES NOT SPILL INTO WATERCOURSE.
4. CONSTRUCT SEDIMENT BARRIERS ACROSS THE ENTIRE CONSTRUCTION R.O.W. TO PREVENT SILT LADEN WATER AND SPOIL FROM FLOWING BACK INTO WATERBODY. BARRIERS MAY BE TEMPORARILY REMOVED TO ALLOW CONSTRUCTION ACTIVITIES BUT MUST BE REPLACED BY THE END OF EACH WORK DAY. SILT FENCE, HAY BALES OR SANDBAGS MAY BE USED INTERCHANGEABLY.
5. REMOVE PORTABLE BRIDGES AS SOON AS POSSIBLE AFTER PERMANENT SEEDING UNLESS OTHERWISE DIRECTED BY COMPANY REPRESENTATIVE THE STRUCTURE IS TO BE REMOVED IF THERE IS MORE THAN ONE MONTH BETWEEN FINAL GRADING AND SEEDING, AND ALTERNATIVE ACCESS TO THE CONSTRUCTION R.O.W. IS AVAILABLE.
6. DISPOSE OF ANY ROCK AS DIRECTED BY COMPANY REPRESENTATIVE
7. RESTORE AND STABILIZE BED AND BANKS TO APPROXIMATE PRE-CONSTRUCTION CONDITIONS.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

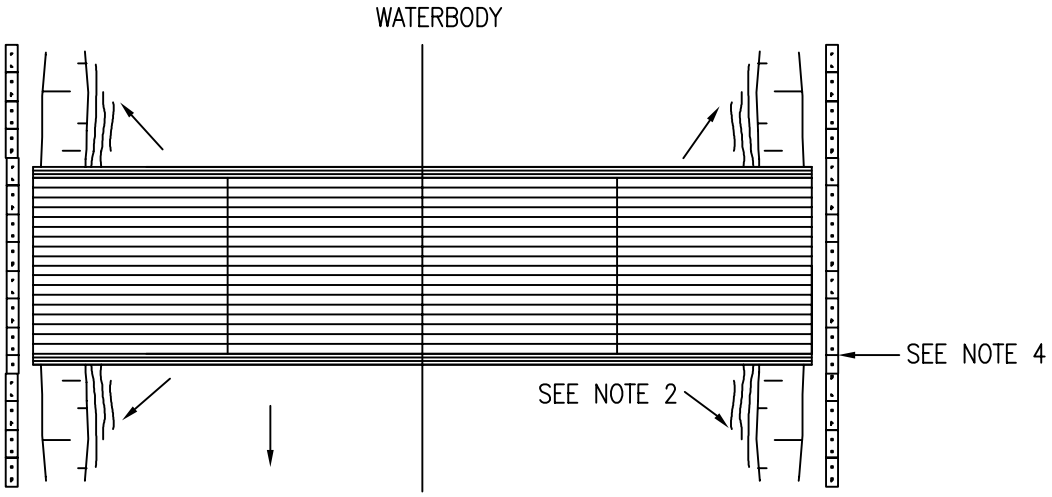
REVISIONS

NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	03/15/04	ISSUED FOR REVIEW	RB	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

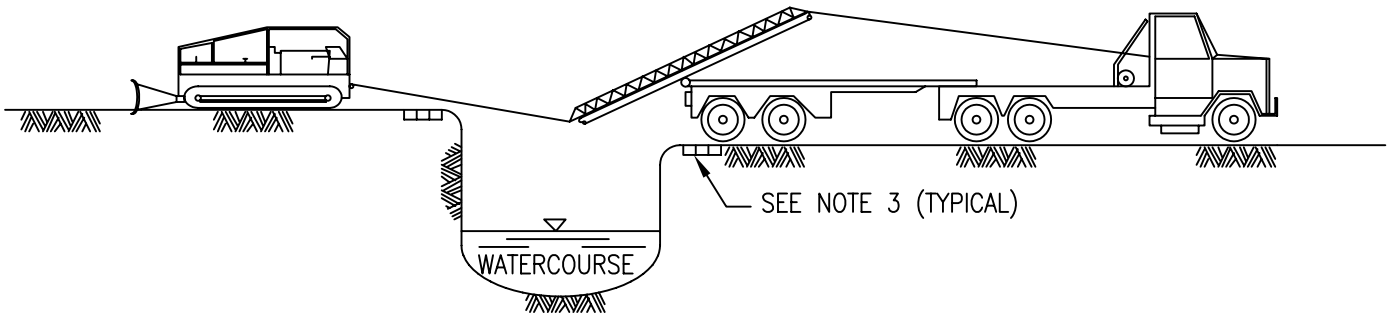
KINDER MORGAN INC

TYPICAL PORTABLE WATERBODY
BRIDGE WITH CULVERT SUPPORT

DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST-P-1000-A345	SH. 1 OF 1



PLAN



PROFILE

NOTES:

1. THIS TYPE OF BRIDGE IS GENERALLY USED ON NARROW, DEEP CROSSINGS.
2. BRIDGE IS ANCHORED AND/OR TIED OFF TO ANCHOR BLOCKS FOR STABILITY.
3. UTILIZE APPROACH FILLS OF CLEAN GRANULAR MATERIAL, SWAMP MATS, SKIDS OR OTHER SUITABLE MATERIALS TO AVOID CUTTING THE BANKS WHEREVER FEASIBLE. ENSURE ADEQUATE FREEBOARD. AS REQUIRED, ENSURE THAT FILL MATERIAL USED DOES NOT SPILL INTO WATERCOURSE.
4. CONSTRUCT SEDIMENT BARRIERS ACROSS THE ENTIRE CONSTRUCTION R.O.W. TO PREVENT SILT LADEN WATER AND SPOIL FROM FLOWING BACK INTO WATERBODY. BARRIERS MAY BE TEMPORARILY REMOVED TO ALLOW CONSTRUCTION ACTIVITIES BUT MUST BE REPLACED BY THE END OF EACH WORK DAY. SILT FENCE, HAY BALES OR SANDBAGS MAY BE USED INTERCHANGEABLY.
5. REMOVE PORTABLE BRIDGES AS SOON AS POSSIBLE AFTER PERMANENT SEEDING UNLESS OTHERWISE DIRECTED BY COMPANY REPRESENTATIVE. THE STRUCTURE IS TO BE REMOVED IF THERE IS MORE THAN ONE MONTH BETWEEN FINAL GRADING AND SEEDING, AND ALTERNATIVE ACCESS TO THE CONSTRUCTION R.O.W. IS AVAILABLE.
6. DISPOSE OF ANY ROCK AS DIRECTED BY THE COMPANY REPRESENTATIVE.
7. RESTORE AND STABILIZE BED AND BANKS TO APPROXIMATE PRE-CONSTRUCTION CONDITIONS.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

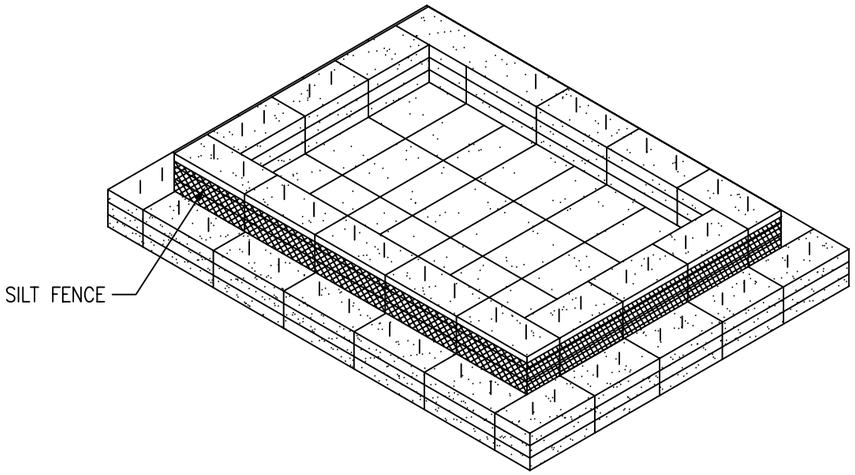
REVISIONS

NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	03/15/04	ISSUED FOR REVIEW	RB	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

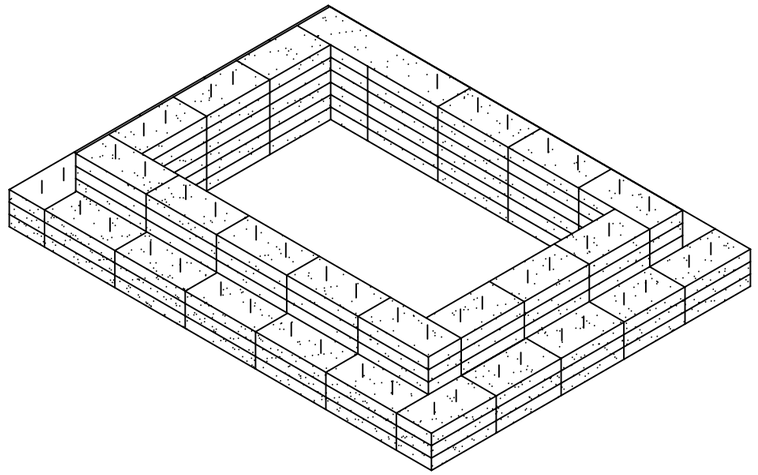
KINDER MORGAN INC

TYPICAL PORTABLE WATERBODY BRIDGE

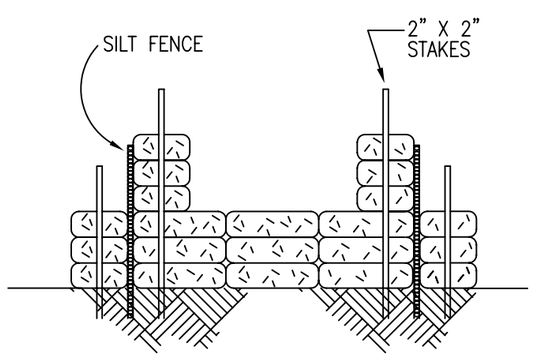
DATE: 07/01/05		APPROVED BY:
SCALE: N.T.S.	CST-P-1000-A340	SH. 1 OF 1



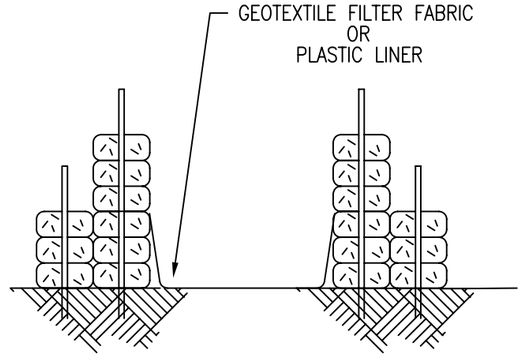
PERSPECTIVE VIEW



PERSPECTIVE VIEW



OPTION 1



OPTION 2

NOTES:

1. INSTALL A STRAW BALE DEWATERING STRUCTURE WHEREVER IT IS NECESSARY AND AS DIRECTED BY THE COMPANY'S INSPECTOR TO PREVENT THE FLOW OF HEAVILY SILT LADEN WATER INTO WATER BODIES OR WETLANDS.
2. DISCHARGE SITE SHALL BE WELL VEGETATED AND THE TOPOGRAPHY OF THE SITE SUCH THAT WATER WILL FLOW AWAY FROM ANY WORK AREAS. THE AREA DOWN SLOPE FROM THE DEWATERING SITE MUST BE REASONABLY PLANE OR STABILIZED BY VEGETATION OR OTHER MEANS TO ALLOW THE FILTERED WATER TO CONTINUE AS SHEET FLOW.
3. IN AREAS OF HIGHLY ERODIBLE SOILS, LINE ENTIRE STRUCTURE WITH GEOTEXTILE FILTER FABRIC, PLASTIC SHEETING, OR STRAW.
4. THE DIMENSIONS OF THE STRUCTURE SHALL BE DETERMINED IN THE FIELD BASED UPON SITE CONDITIONS.
5. DISCHARGE RATES SHALL BE SUCH THAT WATER WILL NOT OVERFLOW THE TOP OF THE STRUCTURE.
6. INSTALL A SPLASH PUP IF THE DISCHARGE VELOCITY IS EXCESSIVE. (CST-P-1000-A160)

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

NO.	DATE	DESCRIPTION	BY	CHKD.	APPR.
1	02/26/04	ISSUED FOR REVIEW	RB	CM	
2	07/13/04	REVISED PER CLIENT COMMENT	RB	CM	
3	07/01/05	ENG REWRITE RELEASE	WS		

KINDER MORGAN INC

TYPICAL STRAW BALE DEWATERING STRUCTURE LARGE VOLUME

DRAWN	CHK. DR.	SCALE	DATE
RB	CM	N.T.S.	07/01/05

PROJECT ENGR. / PROJECT MGR.: - / -

FILE NO. CST-P-1000-B170

Attachment 7 Summary of Threatened and Endangered Species Correspondence

Kentucky

Meeting Minutes

LInitial Project Introduction: USFWS KY Field Office

Kinder Morgan TGP Conversion Project / 172673073

Date/Time:	October 29, 2013 / 9:30 AM ET
Place:	USFWS Office, Frankfort, KY
Attendees:	Jim Gruhala, USFWS Biologist Jeff Benefiel - Stantec Jeff Brown - Stantec Allan Campbell – Kinder Morgan
Distribution:	Jeff Benefiel, Allan Campbell

Item: Introduction to the Kinder Morgan TGP Conversion Project — **Action:**

Meeting started with overview of Kinder Morgan and the TGP Conversion Project. [Kinder Morgan Fact Sheet; system map; Kinder Morgan/MarkWest Utica EMG Joint Venture map; and project overview letter dated October 21, 2013 handout provided]

Stantec will follow up regarding report submittal and coordination.

- Valve and tap replacement
- Approximately 32 locations on existing ROW in the Commonwealth of Kentucky have proposed construction activities.
- Repurposing 1 of 4 existing lines with new build of about 200 miles in TX and LA
- Area of disturbance approximately 100 ft wide and 400 ft long at each location
- HDD the Ohio River and Dix River
- FERC lead agency. Application expected to be submitted late March 2014
- Currently initiating agency coordination
- Field surveys to start early November

Stantec to provide shapefiles of centerline and work areas.

(Shapefiles provided via email 11-5-2013)

<u>Programmatic Agreement</u>

A Programmatic Agreement, January 2, 2013, exists between the USFWS and TPG. It provides county lists of species and covers activities where no further coordination with USFWS is required. This may cover some of the proposed construction activities but the USFWS would need to review and comment on the entire project within its jurisdiction.

Ohio River HDD Crossing

No mussel surveys would be required at areas where in stream disturbance is not proposed.

If any tree clearing is necessary in order to string the pipe or stage the equipment, USFWS suggests clearing between October 1 and March 31. Otherwise, survey may be necessary to show probable absence of species.

Species to consider

A county list of species can be found on USFWS Kentucky Office website. It will be updated soon and should be reviewed to verify and changes. Species of possible concern were discussed and include:

- Indiana bat – considered present in all counties in KY. Clearing of trees should be completed between October 15 and March 31 whenever possible to avoid direct effects to Indiana bat. Impacts near sensitive areas can be addressed under the Indiana Bat Conservation Fund (see below).

- Virginia big-eared bat (VBEB) – no Effect determination expected unless ROW located near known VBEB cave habitat. USFWS will comment and respond to submission of initial habitat assessment report.

- Northern long-eared bat (NLEB) - proposed for federal listing as endangered. Decision expected to occur in fall 2014. Seasonal clearing dates used for Indiana bat are recommended to follow for the NLEB. Not required, but highly recommended as listing is very likely to occur.

- Running buffalo clover - survey only when in bloom (late April into early June). There is a list of approved surveyors. Additional surveyors can be added to the list should they meet the appropriate qualifications. Reference locations can be provided in order to note similarities and verify bloom dates. Areas where potential habitat exist (riparian areas with broken sunlight) should be surveyed during the blooming period by qualified botanists.

- Bald eagle - known nest locations will be provided by USFWS. Standard avoidance measures will need to be implemented (reduced visual and noise disturbance within close proximity to active nests). Guidance is available on USFWS website for avoidance.

Indiana Bat Conservation Fund

In-lieu fee is used for removing habitat for Indiana bats as an indirect effect (no take expected). Such effects would be where habitat is removed near hibernacula and known maternal sites. Kinder Morgan can pay into the program to forego formal consultation.

MBTA

Kinder Morgan has a standard plan to avoid direct impacts to Migratory Bird Treaty Act (MBTA) species. J. Gruhala agreed the plan sounded appropriate.

Construction avoidance dates in Kentucky are April 15 to August 15. Surveys of construction areas should be conducted prior to vegetation clearing during this timeframe to verify avoidance of MBTA.

Survey Document

Each location where valve and tap replacement would occur will be surveyed for wetlands and streams, and habitat characterized for species assessment. The survey document will include:

- Survey methods
- Photos
- Habitat characterization
- Species assessment for each area and discussion if further survey may be required
- Preliminary determination for each site and species provided for concurrence to USFWS

J. Gruhala agreed this initial survey methodology and reporting was sufficient for his review. He suggested referencing the programmatic agreement for species in which a Not Likely To Adversely Affect determination had already been made for similar construction activities.

The meeting adjourned at 10:30 AM
The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Stantec Consulting Services Inc.

Jeff Brown, M.En.
Senior Environmental Scientist
Phone: (513) 842-8205
Fax: (513) 842-8250
Jeff.Brown@stantec.com

Attachment: Kinder Morgan provided attachment and map during meeting. USFWS provided list of Running Buffalo Clover surveyors.

c. file; Kristin Weidner

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

November 20, 2013

Mr. Jeff Brown
Senior Environmental Scientist
Stantec Consulting
11687 Lebanon Road
Cincinnati, Ohio 45241-2012

Re: FWS 2014-B-0044; Kinder Morgan, Inc., Tennessee Gas Pipeline (TGP) Conversion Project to transport natural gas liquids from Ohio to the Gulf Coast

Dear Mr. Brown:

Thank you for meeting with Jim Gruhala of my staff October 29, 2013 to discuss the above-referenced project. The U.S. Fish and Wildlife Service (Service) has reviewed the information you have provided, and offers the following comments in accordance with the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*), the Migratory Bird Treaty Act (MBTA) (40 Stat. 775, as amended; 16 U.S.C. 703 *et seq.*), and the Bald and Golden Eagle Protection Act (BGEPA) (54 Stat. 250, as amended, 16 U.S.C. 668a-d).

According to the shape-file that you provided, the proposed project area traverses the following counties within the Commonwealth of Kentucky

Allen	Clark	Lewis	Simpson
Barren	Garrard	Madison	Taylor
Bath	Green	Marion	
Boyle	Greenup	Montgomery	
Carter	Hart	Rowan	

In addition to Kentucky, the proposed project area would be within the States of Ohio, Tennessee, Mississippi, Louisiana, and Texas. There may also be interrelated actions within the States of Pennsylvania, New York and possibly to other States of the Utica and Marcellus shale resource plays. These comments apply for the portion of the proposed project within the Commonwealth of Kentucky. We recommend contacting the Service's field offices within those other States to ensure that the entire project would be in compliance with the ESA, MBTA, BGEPA, and other applicable statutes.

Endangered Species Act

In order to assist you in determining if the proposed activities have the potential to impact protected species we have searched our records for occurrences of listed species within the vicinity of the proposed project sites. Based upon the information provided to us and according to our databases, we believe that the following federally listed and protected species have the potential to occur within or within the vicinity of the proposed action area in Kentucky:

Common Name	Scientific Name	Federal Status
Indiana bat	*Myotis sodalis*	endangered
gray bat	*Myotis grisescens*	endangered
Northern long-eared bat	*Myotis septentrionalis*	proposed
Virginia big-eared bat	*Corynorhinus townsendii virginianus*	endangered
diamond darter	*Crystallaria cincotta*	endangered
Kentucky cave shrimp	*Palaemonias ganteri*	endangered
Tatum cave beetle	*Pseudanopthalmus parvus*	candidate
clubshell	*Pleurobema clava*	endangered
fanshell	*Cyprogenia stegaria*	endangered
fluted kidneyshell	*Ptychobranchus subtentum*	proposed
littlewing pearlymussel	*Pegias fabula*	endangered
northern riffleshell	*Epioblasma torulosa rangiana*	endangered
orangefoot pimpleback	*Plethobasus cooperianus*	endangered
pink mucket	*Lampsilis abrupta*	endangered
rabbitsfoot	*Quadrula cylindrica*	threatened
ring pink	*Obovaria retusa*	endangered
rough pigtoe	*Pleurobema plenum*	endangered
sheepnose	*Plethobasus cyphyus*	endangered
slabside pearlymussel	*Lexingtonia dolabelloides*	proposed
snuffbox	*Epioblasma triquetra*	endangered
spectaclecase	*Cumberlandia monodonta*	endangered
Short's bladderpod	*Physaria globosa*	candidate
running buffalo clover	*Trifolium stoloniferum*	endangered
Virginia spiraea	*Spiraea virginiana*	threatened

We must advise you that collection records available to the Service may not be all-inclusive. Our database is a compilation of collection records made available by various individuals and resource agencies. This information is seldom based on comprehensive surveys of all potential habitats and thus does not necessarily provide conclusive evidence that protected species are present or absent at a specific locality.

Based on the information you have submitted, the majority of the proposed project-associated actions within Kentucky would involve construction and other work in previously disturbed areas or within existing, maintained facilities or ROWs. Typically, such actions do not result in significant adverse impacts to the aforementioned listed species. However, certain considerations must be made for actions that are described in the following categories 1-7.

1. The Indiana bat and the Northern long-eared bat are known to occur or have the potential to occur Statewide in Kentucky. All projects involving tree removal, felling of trees and/or side-trimming of tree branches, have the potential to adversely affect the Indiana bat and Northern long-eared bat, as these trees could provide summer roosting habitat for both of these bat species. A map of Indiana bat habitat in Kentucky that identifies known habitat and potential habitat can be accessed at http://ww.fws.gov/frankfort/indiana_bat_procedures.html. Project-specific consultations are recommended for all such projects in known habitat and for projects in potential habitat if the tree removal or tree trimming occurs between April 1st and October 14th.

2. Projects involving stream channel or bank disturbance or discharges (such as from hydrostatic testing) have the potential to negatively impact protected aquatic species, which may occur within the watersheds impacted by these actions. These species include several freshwater mussel species, and the Kentucky cave shrimp. Projects involving stream channel or bank disturbance or discharges will require project-specific consultations in the following locations and should address all potential impacts to the specified species:
    a. Ohio River (Lewis County) - clubshell, fanshell, orangefoot pimpleback, pink mucket, rabbitsfoot, ring pink, rough pigtoe, sheepnose, and snuffbox;
    b. Green River (Allen, Green, Hart, and Taylor Counties) – diamond darter critical habitat, clubshell, fanshell, pink mucket, rabbitsfoot, ring pink, rough pigtoe, sheepnose, snuffbox and spectaclecase ;
    c. Red River and Lower Cumberland River watersheds (Simpson County) - fanshell, fluted kidneyshell, littlewing pearlymussel, ring pink, slabside pearlymussel;
    d. Rolling Fork River (Marion County) – fanshell and snuffbox
    e. Ground-water basins (Barren and Hart Counties) - Kentucky cave shrimp Additionally, projects where karst features (e.g. sinkholes, caves, swallets, streams, springs, etc.) are found within the project area also require project-specific coordination. If karst features are discovered after the project start, please contact the Service's Kentucky Field Office immediately (502/695-0468) as a site visit and additional protective measures may be warranted.

3. Projects involving stream channel or bank disturbance or discharges (such as from hydrostatic testing) also have the potential to impact gray bats, which utilize low-flow stream corridors as their primary foraging habitat Projects involving stream channel or bank disturbance or discharges to intermittent and perennial streams in Allen, Barren, Carter, Garrard, Green, Hart, Madison, Rowan, and Simpson Counties will require project-specific consultations, which address all potential impacts to the gray bat.

4. Projects involving disturbances to clifflines, rockshelters, sink holes, and/or caves located in Rowan County have the potential to impact Virginia big-eared bats, which utilize these geologic features as roost habitat. Project-specific consultations are required for such projects to address all potential impacts to the Virginia big-eared bat.

5. Project-specific consultations are required for all ground disturbing activities within the following counties. These project-specific consultations in the following counties should address all potential impacts to the specified species:
    a. Clark, Garrard, Greenup, Madison, and Montgomery Counties - running buffalo clover
    b. Lewis County - Virginia spirea
    c. Clark, Garrard and Madison Counties - Short's bladderpod

6. Project-specific consultations are required for all projects involving the application of herbicides so that the Service can review the proposed agents for their potential toxicity to the aforementioned protected species.

7. Projects involving stream channel or bank disturbance or discharges (such as from hydrostatic testing) have the potential to negatively impact the Tatum cave beetle, which may occur in caves within the watersheds impacted by these actions. Projects involving stream channel or bank disturbance or discharges in Marion County will require project-specific consultations and should address all potential impacts to the Tatum cave beetle. Additionally, projects where karst features (e.g. sinkholes, caves, swallets, streams, springs, etc.) are found within the project area also require project-specific coordination. If karst features are discovered after the project start, please contact the Service's Kentucky Field Office immediately (502/695-0468) as a site visit and additional protective measures may be warranted.

Migratory Bird Treaty Act

There are a number of migratory non-game birds that are tolerant of and dependent upon light to moderate amounts of disturbance to maintain open habitat conditions (*i.e.*; ROW habitat) for breeding, nesting, and foraging habitat. Project-specific consultations are required for all projects involving the application of herbicides so the Service can review the proposed agents for their potential toxicity to migratory non-game birds. The Service also recommends that mowing activities (*i.e.*; bush-hogging) be restricted from April 15th through August 31st to avoid migratory non-game birds which may be nesting within ROWs. If this seasonal restriction is not practicable a migratory bird conservation plan should be developed and submitted to our office for review and approval.

Bald and Golden Eagle Protection Act

Several records for bald eagle nest sites exist within the vicinity of the proposed project area. While none of these records occur within 10 miles of your pipeline locations, new or previously unidentified nests may be located in closer proximity and/or within the proposed project area. Although the bald eagle has been removed from the List of Endangered and Threatened Species, it continues to be protected under the MBTA and the BGEPA. The Service developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the BGEPA. A copy of the NBEM Guidelines is available at: http://www. fws.gov/southeast/es/baldeagle/NationalBaldEagleManagementGuidelines.pdf. Those guidelines recommend: (1) maintaining a specified distance between the activity and the nest (buffer area); (2) maintaining

natural areas (preferably forested) between the activity and nest trees (landscape buffers); and (3) avoiding certain activities during the breeding season. On-site personnel should be informed of the possible presence of nesting bald eagles within the project boundary, and should identify, avoid, and immediately report any such nests to this office. If a bald eagle nest is discovered within 1,500 feet of a proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: http://www.fws.gov/southeast/es/baldeagle. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary. The Division of Migratory Birds for the Southeast Region of the Service (phone: 404/679-7051, email: SEmigratorybirds@fws.gov) has the lead role in conducting such consultations. Should you need further assistance interpreting the guidelines or performing an on-line project evaluation, please contact this office.

Thank you again for your request. Your concern for the protection of endangered and threatened species is greatly appreciated. If you have any questions, please contact Jim Gruhala of my staff at (502) 695-0468 extension 116.

Sincerely,

Virgil Lee Andrews, Jr.
Field Supervisor

TELEPHONE DISCUSSION RECORD

Kinder Morgan UMTP Project

Discussion with: Jim Gruhala

May 13, 2014 1:00 PM Eastern Time

Owner: Jeff Brown

Project Number: 172673073

DISCUSSION

I called J. Gruhala to inquire whether he had received the GIS files and had any questions regarding the differences between the 2013 set of data and the current set. He indicated that he was currently reviewing the information. I directed him to the proposed new build location in Carter and Lewis counties that was approximately seven miles in length. I informed him that the need was based on engineering analysis and project refinement.

I requested that USFWS provide a revised technical assistance letter addressing the new data. Mr. Gruhala said that he would provide a letter supplementing the November 20, 2013 letter previously received.

Mr. Gruhala indicated that the seven mile proposed new build section in Carter and Lewis counties fell within documented swarming habitat of the federally endangered Indiana bat as well as potential habitat for the currently proposed species, the northern long-eared bat. The habitat that would be removed as a result of the project would need to be evaluated to determine if the project would likely or not likely adversely affect the Indiana bat and northern long-eared bat. Seasonally clearing (removing this habitat between the dates of November 15th through March 15th) is recommended, but this measure may not be sufficient to support a "not likely to adversely affect" determination.

Mr. Gruhala explained that under the ESA, the USFWS has to consider the effects of the entire action and Section 7 compliance is not segmented by state. The USFWS may designate a lead office or person to ensure Section 7 compliance. We discussed the various states and species that were possibly affected by the project. Bats were most widespread. Mr. Gruhala suggested that the lead USFWS office may be able to apply the USFWS KY in lieu conservation fund to mitigate for the project's adverse effects to the Indiana bat and northern long-eared bat if the project is determined to likely adversely affect these species. This would be at the discretion of the USFWS. He indicated that based on initial GIS review and his experience with similar projects, options such as Formal Consultation would be available to complete section 7 consultation under the ESA and allow the project be in full compliance with the ESA .

I informed Mr. Gruhala that if he had any questions regarding the project that he could email or call me directly. He indicated that should Kinder Morgan or Stantec-TRC have any questions that he would gladly answer them. He indicated that the coordination was appreciated and that consulting upfront was a great step for helping to ensure the project moves forward smoothly.

Action: J. Gruhala to provide revised technical assistance based on new data.

Signature

Cc: Allan Campbell-Kinder Morgan
Jeff Benefiel-Stantec
Jess Haider-Stantec

Revised 2014-5-16

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

June 2, 2014

Mr. Jeff Brown
Senior Environmental Scientist
Stantec Consulting
11687 Lebanon Road
Cincinnati, Ohio 45241-2012

Re: FWS 2014-B-0044; Kinder Morgan, Inc., Utica Marcellus Texas Pipeline (UMTP) Project (Formerly Tennessee Gas Pipeline (TGP) Conversion Project) to transport natural gas liquids from Ohio to the Gulf Coast

Dear Mr. Brown:

Thank you for providing information regarding modifications to the proposed UMTP project. The U.S. Fish and Wildlife Service (Service) has reviewed the information you have provided, and offers the following comments in accordance with the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*), the Migratory Bird Treaty Act (MBTA) (40 Stat. 775, as amended; 16 U.S.C. 703 *et seq.*), and the Bald and Golden Eagle Protection Act (BGEPA) (54 Stat. 250, as amended, 16 U.S.C. 668a-d).

According to the shape-file that you provided, the proposed project area traverses the following counties within the Commonwealth of Kentucky

Allen	Clark	Lewis	Simpson
Barren	Garrard	Madison	Taylor
Bath	Green	Marion	
Boyle	Greenup	Montgomery	
Carter	Hart	Rowan	

As you are aware, the Service originally reviewed the proposed project during November, 2013 when the project was identified as the TGP conversion project. Based on the information that you submitted during April, 2014, the project has been modified to include construction of new segments of pipeline, including an approximate 7 mile segment within Carter and Lewis Counties, Kentucky, and tap relocations. These project components were not considered during our original review. The approximate 7 mile new build section of pipeline is situated within known Indiana bat swarming habitat. As described in category 1 on the following page, the new build section may have adverse effects to the Indiana bat and potentially to the Northern long-eared bat. If so, entering into an Indiana Bat Conservation Memorandum of Agreement (MOA) may be an available option to mitigate for the project's adverse effects and allow the project to be in compliance to the ESA relative to the Indiana bat and Northern long-eared bat.

In addition to Kentucky, the proposed project area would be within the States of Ohio, Tennessee, Mississippi, Louisiana, and Texas. There may also be interrelated actions within the States of Pennsylvania, New York and possibly to other States of the Utica and Marcellus shale resource plays. These comments apply for the portion of the proposed project within the Commonwealth of Kentucky. We recommend continuing consultation with the Service's field offices within the other listed States to ensure that the entire project would be in compliance with the ESA, MBTA, BGEPA, and other applicable statutes. The Service may designate a lead field office at some point during the consultation process.

Endangered Species Act

In order to assist you in determining if the proposed activities have the potential to impact protected species we have searched our records for occurrences of listed species within the vicinity of the proposed project sites. Based upon the information provided to us and according to our databases, we believe that the following federally listed and protected species have the potential to occur within or within the vicinity of the proposed action area in Kentucky:

Common Name	Scientific Name	Federal Status
Indiana bat	*Myotis sodalis*	endangered
gray bat	*Myotis grisescens*	endangered
Northern long-eared bat	*Myotis septentrionalis*	proposed
Virginia big-eared bat	*Corynorhinus townsendii virginianus*	endangered
diamond darter	*Crystallaria cincotta*	endangered
Kentucky cave shrimp	*Palaemonias ganteri*	endangered
Tatum cave beetle	*Pseudanopthalmus parvus*	candidate
clubshell	*Pleurobema clava*	endangered
fanshell	*Cyprogenia stegaria*	endangered
fluted kidneyshell	*Ptychobranchus subtentum*	proposed
littlewing pearlymussel	*Pegias fabula*	endangered
northern riffleshell	*Epioblasma torulosa rangiana*	endangered
orangefoot pimpleback	*Plethobasus cooperianus*	endangered
pink mucket	*Lampsilis abrupta*	endangered
rabbitsfoot	*Quadrula cylindrica*	threatened
ring pink	*Obovaria retusa*	endangered
rough pigtoe	*Pleurobema plenum*	endangered
sheepnose	*Plethobasus cyphyus*	endangered
slabside pearlymussel	*Lexingtonia dolabelloides*	proposed
snuffbox	*Epioblasma triquetra*	endangered
spectaclecase	*Cumberlandia monodonta*	endangered
Short's bladderpod	*Physaria globosa*	candidate
running buffalo clover	*Trifolium stoloniferum*	endangered
Virginia spiraea	*Spiraea virginiana*	threatened

We must advise you that collection records available to the Service may not be all-inclusive. Our database is a compilation of collection records made available by various individuals and resource agencies. This information is seldom based on comprehensive surveys of all potential

habitats and thus does not necessarily provide conclusive evidence that protected species are present or absent at a specific locality.

Based on the information you have submitted, the majority of the proposed project-associated actions within Kentucky would involve construction and other work in previously disturbed areas or within existing, maintained facilities or ROWs. Typically, such actions do not result in significant adverse impacts to the aforementioned listed species. However, certain considerations must be made for actions that are described in the following categories 1-7.

1. The Indiana bat and the Northern long-eared bat are known to occur or have the potential to occur Statewide in Kentucky. All projects involving tree removal, felling of trees and/or side-trimming of tree branches, have the potential to adversely affect the Indiana bat and Northern long-eared bat, as these trees could provide summer roosting habitat for both of these bat species. A map of Indiana bat habitat in Kentucky that identifies known habitat and potential habitat can be accessed at http://ww.fws.gov/frankfort/indiana_bat_procedures.html. Project-specific consultations are recommended for all such projects in known habitat and for projects in potential habitat if the tree removal or tree trimming occurs between April 1st and October 14th.

2. Projects involving stream channel or bank disturbance or discharges (such as from hydrostatic testing) have the potential to negatively impact protected aquatic species, which may occur within the watersheds impacted by these actions. These species include several freshwater mussel species, and the Kentucky cave shrimp. Projects involving stream channel or bank disturbance or discharges will require project-specific consultations in the following locations and should address all potential impacts to the specified species:
    a. Ohio River (Lewis County) - clubshell, fanshell, orangefoot pimpleback, pink mucket, rabbitsfoot, ring pink, rough pigtoe, sheepnose, and snuffbox;
    b. Green River (Allen, Green, Hart, and Taylor Counties) – diamond darter critical habitat, clubshell, fanshell, pink mucket, rabbitsfoot, ring pink, rough pigtoe, sheepnose, snuffbox and spectaclecase ;
    c. Red River and Lower Cumberland River watersheds (Simpson County) - fanshell, fluted kidneyshell, littlewing pearlymussel, ring pink, slabside pearlymussel;
    d. Rolling Fork River (Marion County) – fanshell and snuffbox
    e. Ground-water basins (Barren and Hart Counties) - Kentucky cave shrimp Additionally, projects where karst features (e.g. sinkholes, caves, swallets, streams, springs, etc.) are found within the project area also require project-specific coordination. If karst features are discovered after the project start, please contact the Service's Kentucky Field Office immediately (502/695-0468) as a site visit and additional protective measures may be warranted.

3. Projects involving stream channel or bank disturbance or discharges (such as from hydrostatic testing) also have the potential to impact gray bats, which utilize low-flow stream corridors as their primary foraging habitat Projects involving stream channel or bank disturbance or discharges to intermittent and perennial streams in Allen, Barren,

Carter, Garrard, Green, Hart, Madison, Rowan, and Simpson Counties will require project-specific consultations, which address all potential impacts to the gray bat.

4. Projects involving disturbances to clifflines, rockshelters, sink holes, and/or caves located in Rowan County have the potential to impact Virginia big-eared bats, which utilize these geologic features as roost habitat. Project-specific consultations are required for such projects to address all potential impacts to the Virginia big-eared bat.

5. Project-specific consultations are required for all ground disturbing activities within the following counties. These project-specific consultations in the following counties should address all potential impacts to the specified species:
    a. Clark, Garrard, Greenup, Madison, and Montgomery Counties - running buffalo clover
    b. Lewis County - Virginia spirea
    c. Clark, Garrard and Madison Counties - Short's bladderpod

6. Project-specific consultations are required for all projects involving the application of herbicides so that the Service can review the proposed agents for their potential toxicity to the aforementioned protected species.

7. Projects involving stream channel or bank disturbance or discharges (such as from hydrostatic testing) have the potential to negatively impact the Tatum cave beetle, which may occur in caves within the watersheds impacted by these actions. Projects involving stream channel or bank disturbance or discharges in Marion County will require project-specific consultations and should address all potential impacts to the Tatum cave beetle. Additionally, projects where karst features (e.g. sinkholes, caves, swallets, streams, springs, etc.) are found within the project area also require project-specific coordination. If karst features are discovered after the project start, please contact the Service's Kentucky Field Office immediately (502/695-0468) as a site visit and additional protective measures may be warranted.

Migratory Bird Treaty Act

There are a number of migratory non-game birds that are tolerant of and dependent upon light to moderate amounts of disturbance to maintain open habitat conditions (*i.e.*; ROW habitat) for breeding, nesting, and foraging habitat. Project-specific consultations are required for all projects involving the application of herbicides so the Service can review the proposed agents for their potential toxicity to migratory non-game birds. The Service also recommends that mowing activities (*i.e.*; bush-hogging) be restricted from April 15th through August 31st to avoid migratory non-game birds which may be nesting within ROWs. If this seasonal restriction is not practicable a migratory bird conservation plan should be developed and submitted to our office for review and approval.

Bald and Golden Eagle Protection Act

Several records for bald eagle nest sites exist within the vicinity of the proposed project area. While none of these records occur within 10 miles of your pipeline locations, new or previously unidentified nests may be located in closer proximity and/or within the proposed project area.

Although the bald eagle has been removed from the List of Endangered and Threatened Species, it continues to be protected under the MBTA and the BGEPA. The Service developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the BGEPA. A copy of the NBEM Guidelines is available at: http://www. fws.gov/southeast/es/baldeagle/NationalBaldEagleManagementGuidelines.pdf. Those guidelines recommend: (1) maintaining a specified distance between the activity and the nest (buffer area); (2) maintaining natural areas (preferably forested) between the activity and nest trees (landscape buffers); and (3) avoiding certain activities during the breeding season. On-site personnel should be informed of the possible presence of nesting bald eagles within the project boundary, and should identify, avoid, and immediately report any such nests to this office. If a bald eagle nest is discovered within 1,500 feet of a proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: http://www.fws.gov/southeast/es/baldeagle. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary. The Division of Migratory Birds for the Southeast Region of the Service (phone: 404/679-7051, email: SEmigratorybirds@fws.gov) has the lead role in conducting such consultations. Should you need further assistance interpreting the guidelines or performing an on-line project evaluation, please contact this office.

Thank you again for your request. Your concern for the protection of endangered and threatened species is greatly appreciated. If you have any questions, please contact Jim Gruhala of my staff at (502) 695-0468 extension 116.

Sincerely,

Virgil Lee Andrews, Jr.
Field Supervisor