



United States
Department of
Agriculture

Forest
Service

Monongahela National Forest

200 Sycamore Street
Elkins, WV 26241
304-636-1800

File Code: 1900; 2700
Date: October 24, 2016

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First St., N.E., Room 1A
Washington, DC 20426

Dear Ms. Bose:

Subject: Request for Site-Specific Design of Stabilization Measures in Selected High-Hazard Portions of the Route of the proposed Atlantic Coast Pipeline Project in the Monongahela National Forest and George Washington National Forest
OEP/DG2E/Gas 4
Atlantic Coast Pipeline, LLC
Docket Nos. CP15-554-000 and CP15-554-001

The Forest Service submits an information request to Atlantic Coast Pipeline, LLC to support the Forest Service's review of ACP's special use proposal for the Atlantic Coast Pipeline Project (ACP Project). The proposed ACP Project would affect 21.2 miles of National Forest System lands in the Monongahela National Forest and George Washington National Forest.

In the attached document, we discuss the objectives of our request for the site-specific design of stabilization measures in selected high-hazard locations along the proposed ACP Project route. We also discuss the methods we followed and the criteria we used to select the representative sites. High-risk sites located on or in close proximity to National Forest System lands were selected to provide a worst-case scenario for analysis and design. Indirect and cumulative effects occur at a landscape scale, therefore such effects are best addressed through an all-lands approach.

For questions, please contact Jennifer Adams, Special Project Coordinator, by phone at (540) 265-5114 or by email at jenniferpadams@fs.fed.us.

Sincerely,


CLYDE THOMPSON
Forest Supervisor

cc: Atlantic Coast Pipeline, LLC



U.S. Forest Service Request for Site-Specific Design of Stabilization Measures in Selected High-Hazard Portions of the Proposed Atlantic Coast Pipeline Route

Introduction and Objectives

The route for the Atlantic Coast Pipeline Project (ACP Project), proposed by Atlantic Coast Pipeline, LLC (ACP) would cross some very challenging terrain in the central Appalachians. Potentially difficult situations include steep slopes, presence of headwater streams, geologic formations with high slippage potential, highly erodible soils, and the presence of high-value natural resources downslope of high hazard areas. These hazards are exacerbated by high annual rates of precipitation and the potential for extreme precipitation events.

Similar hazards on other smaller pipeline projects in the central Appalachians have led to slope failures, erosion and sedimentation incidents, and damage to aquatic resources. Therefore, the Forest Service (FS) is concerned that crossing such challenging terrain with a much larger pipeline could present a high risk of failures that lead to resource damage.

To address these hazards, ACP has proposed implementing “best in class” slope stabilization and erosion/sedimentation control measures. ACP provided general descriptions and conceptual drawings of these methods in its resource reports and other filings. In comments on resource reports and in other formal and informal communication, the FS has asked ACP to provide documentation of the effectiveness of these techniques.

Both the George Washington and Monongahela National Forests contain Forest Plan standards that limit activities in areas that are at high risk for slope and soil instability. To facilitate the acceptance of ACP’s Special Use Permit application for further processing, the Forests need to be able to determine that the project is consistent or can be made consistent with this Forest Plan direction.

To further clarify the likelihood that the ACP can be constructed through the George Washington and Monongahela National Forests without undue risk of resource damage, the Forest Service is requesting that ACP develop site-specific stabilization designs for selected areas of challenging terrain. FS specialists have selected several sites that appear to present a high risk for slope failure, slippage, and erosion/sedimentation. Note that these are merely representative sites that have been selected to demonstrate whether stability can be maintained for the purpose of making a preliminary determination of Forest Plan consistency. Should the ACP Project be permitted, multiple additional high hazard areas will need to be addressed on a site-specific basis.

ACP should present designs for the selected sites that clearly illustrate the following:

- Anticipated hazards at each site
- How the hazards will be minimized, to include specific techniques and materials tailored to the conditions of each site
- Plan and profiles (cross section(s) perpendicular to centerline, and a longitudinal cross section along the centerline) with dimensions (feet) showing 1) the original ground surface, 2) the maximum extent of the cut, fill and spoil during construction, 3) the post-

construction reclaimed ground surface, showing reclamation backfill, reclaimed slopes, and the permanent right-of-way

- Short-term and long-term measures (i.e., construction vs. operation and maintenance periods)
- Provisions for ensuring that long-term stabilization features will remain in place and effective over the life of the project, without the need for continual maintenance
- Rationale and supporting documentation for the likelihood that the techniques and materials used at each site will be effective
- Potential resource impacts in the event of a failure, and how the potential for such impacts will be minimized

Methods Used to Select Representative Sites

- Each Forest selected several locations along the ROW where expert knowledge and resource data indicate a potential “worst case scenario” for 1) trying to maintain slope stability, 2) preventing potential significant indirect adverse effects to resources such as water quality, hydrology and aquatic ecosystems, and 3) ensure that long-term maintenance and stability can be accomplished if the project is implemented.
- GWNF provided narratives to highlight representative site-specific Forest Service-administered areas of concern along the portion of the ROW that crosses this Forest in Virginia. The following data sources were used:
 - Topographic maps
 - surface ownership layer
 - ACP survey corridor and proposed centerline
 - Geologic formations and field survey data from the geohazard assessment
- MNF conducted an analysis that provided maps and a narrative. Some MNF sites are located partially or completely on private land because (1) the site is downslope of National Forest System (NFS) land such that a major slope failure could affect NFS land, or (2) the private land site is considered a worst-case representative of similar situations on NFS land. The following data was used in Arc GIS:
 - topographic maps
 - surface ownership layer
 - ACP survey corridor and proposed centerline
 - geology layer (used to identify the presence or absence of Mauch Chunk and other geologic formations known to have high risk of slippage and slope failure)
 - A slope layer generated by FS GIS staff using 3 meter DEM data
 - field survey data from the geohazard assessment and Order 1 Soil Survey

Selected Sites

George Washington National Forest

GWNF Site 1

MP 83.95 Geohazard ID SS036

“Horizontally-bedded rock is exposed near top of the slope. Shallow bedrock underlies the slope as it descends eastward at an inclination of approximately 26 degrees (50%). The slope flattens and initially there is ample room for construction but the alignment then approaches a ridge that narrows. There is some evidence of shallow surficial creep on sides of ridge.” Comment column in Geohazards Summary Table, Appx 6-1, Geohazard Phase 2 Report

“Conventional steep slope construction but care required to prevent spoil from spilling over sides of narrow ridge.” Recommendations column in Geohazards Summary Table, Appx 6-1, Geohazard Phase 2 Report

GWNF Site 2

Geohazard ID SS038

“From MP 84.9 to MP 85.0, the alignment ascends an extremely steep slope inclined at 46 degrees (105%) which shallows to 31 degrees (60%).” Comment column in Geohazards Summary Table, Appx 6-1, Geohazard Phase 2 Report

“Site specific trench backfill stabilization design required on extremely steep slope segments because during right-of-way grading and pipeline trench excavation, disturbance to the existing shale and sandstone bedrock will result in material with reduced strength parameters. Given the extremely steep slope inclination, this disturbed material will not be stable as trench backfill unless stabilization measures are implemented.” Recommendations column in Geohazards Summary Table, Appx 6-1, Geohazard Phase 2 Report

GWNF Site 3

From MP 86.5 to 87.2 the alignment follows ridge crest which is very narrow in some places (~20 feet wide). If SS 044 is one of those very narrow sites, use it for site-specific design. If SS 044 is not one of those very narrow sites, use another site on very narrow ridge from MP 86.5 to 87.2

“The alignment follows a ridge crest with steep slopes identified along either side of the route. The centerline has been mapped slightly off of the ridge crest, thus causing the route to apparently intersect steep slopes that would be avoided if the centerline were on top of the ridge crest. The ridge crest is very narrow in some places (~20 feet wide).” Comment column in Geohazards Summary Table, Appx 6-1, Geohazard Phase 2 Report

“During construction the ridge crest will have to be widened and flattened to provide sufficient work space. Care will be required to prevent spoil from spilling over the side slopes.” Recommendations column in Geohazards Summary Table, Appx 6-1, Geohazard Phase 2 Report

GWNF Site 4

MP 120.1 Geohazard ID SS060

“Smooth, planar slope that toes into a dry secondary stream channel. The lower portion of the slope is inclined at approximately 39 degrees (80%), and breaks to an inclination of approximately 35 degrees (70%) in the upper portion of the slope. Evidence of shallow creep was observed. Because of the very consistent angle of inclination, the slope was suspected to be a dip-slope controlled by bedrock structure, however, no bedrock outcrops were observed. At the time of the field reconnaissance, the slope was well-drained and dry and stable. Expect difficult construction conditions due to the extremely steep inclination and anticipated difficulty in achieving stable trench backfill.” Comment column in Geohazards Summary Table, Appx 6-1, Geohazard Phase 2 Report

“Site specific trench backfill stabilization design required because during right-of-way grading and pipeline trench excavation, disturbance to the existing silt and clay and sand and gravel soil and the underlying siltstone bedrock will result in material with reduced strength parameters. Given the extremely steep slope inclination, this disturbed material will not be stable as trench backfill unless stabilization measures are implemented. Also, there is limited work space at the toe of the slope due to the proximity of a flowing stream channel and potential for scour at the toe of the slope due to the presence of a relict channel.” Recommendations column in Geohazards Summary Table, Appx 6-1, Geohazard Phase 2 Report

GWNF Site 5

MP 120.3 Geohazard ID SL 235

“Very steep to extremely steep (30 degrees [58%]), short slope. Old logging trail cuts obliquely across the slope. Slope surface is uneven and hummocky. Some tree trunks are curved. Appears to be a small, shallow dormant landslide.” Comment column in Geohazards Summary Table, Appx 6-1, Geohazard Phase 2 Report

“This site should be investigated with test pits in order to design drainage and grading mitigations.” Recommendations column in Geohazards Summary Table, Appx 6-1, Geohazard Phase 2 Report

GWNF Site 6

40%-58% slope south of SC_1105 identified in orange, and north of MP 155 on Sheet 73, Appx 6-2 Part 1, Geohazard Phase 2 Report. Site added to include a Blue Ridge site.

Monongahela National Forest

MNF Site 1 (Attachment A)

Between ACP's Mileposts 73 and 74 where the buffered ROW will cross areas with slopes of 80-90, 90-100, and >100% and which are also present on Mauch Chunk geology. This area of concern is presented on public land and also on private land.

MNF Site 2 (Attachment B)

Between ACP's Mileposts 72 and 73 where the buffered ROW will cross areas with slopes of 60-70, 70-80, and 80-90%. These areas are also present on Mauch Chunk geology on private land.

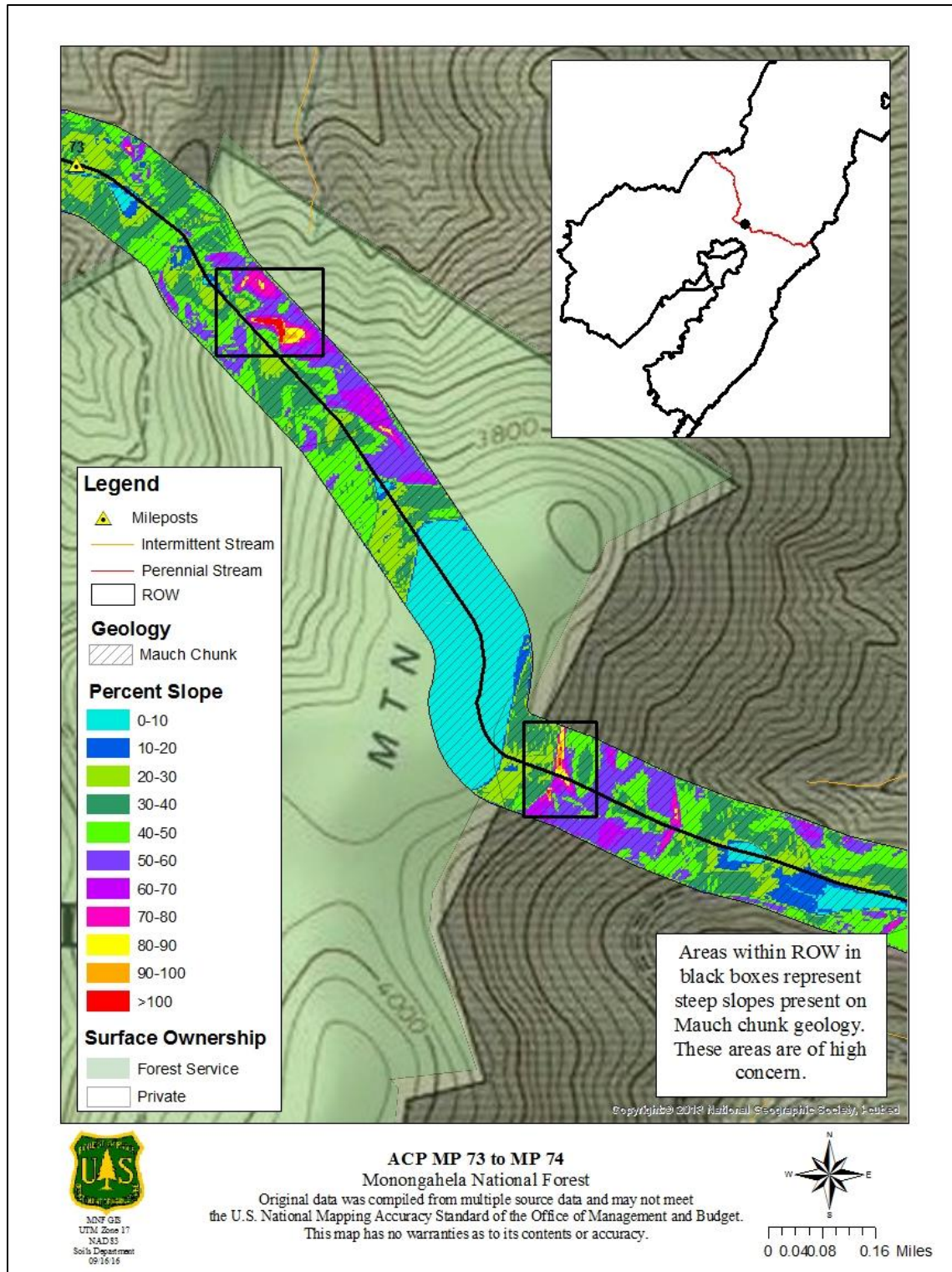
MNF Site 3 (Attachment C)

Between Mileposts 78 to 79 where the buffered ROW will cross areas with slopes 70-80, 80-90, 90-100, and in some cases >100%. These areas are present on Chemung geology but still pose a risk on steep slopes. These areas of concern are present on private lands.

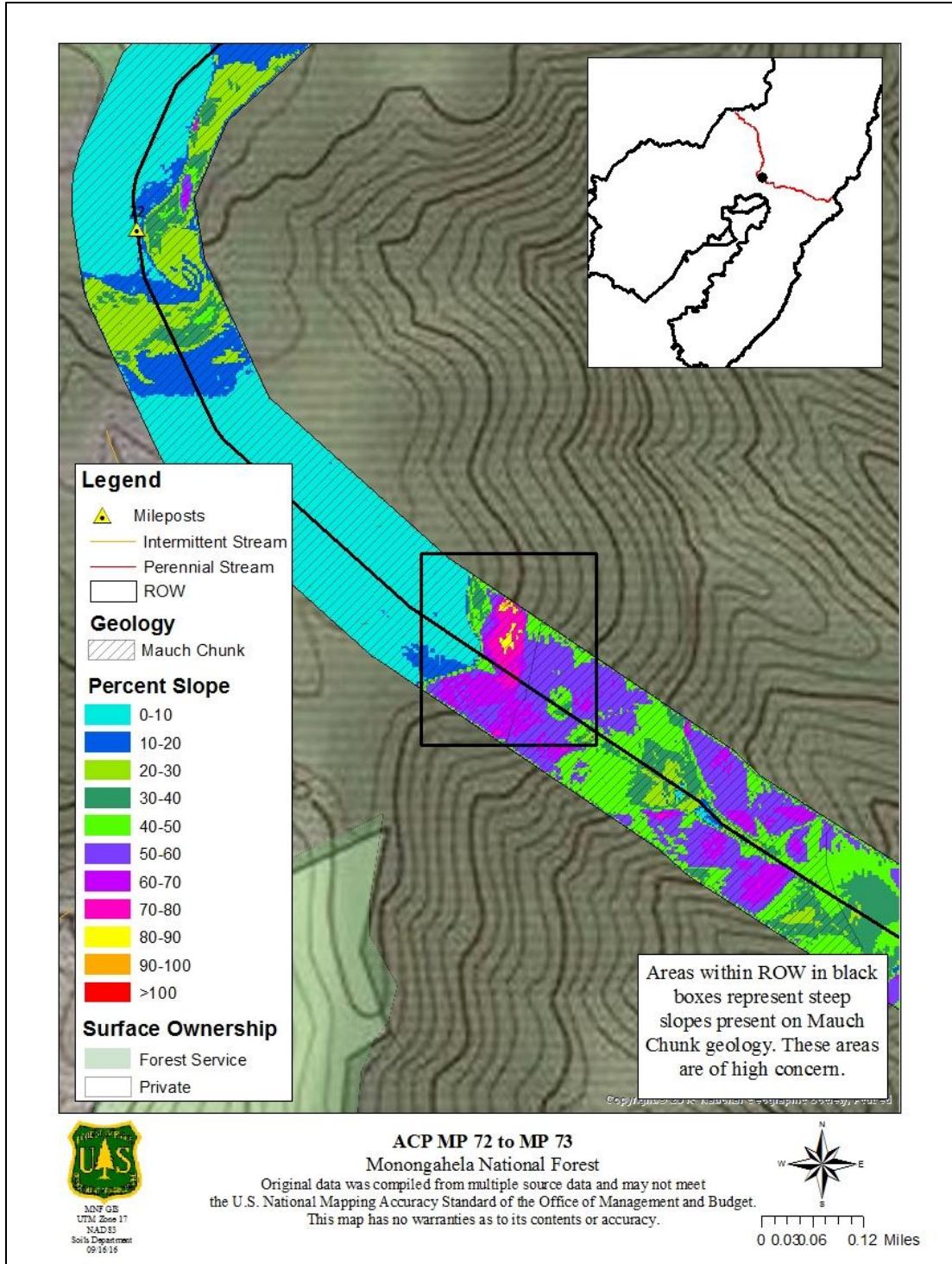
MNF Site 4 (Attachment D)

Between Mileposts 82 and 83 where the buffered ROW and centerline intercepts an intermittent stream, 60-70, 70-80, and 80-90% slopes. These areas of concern are present on public land.

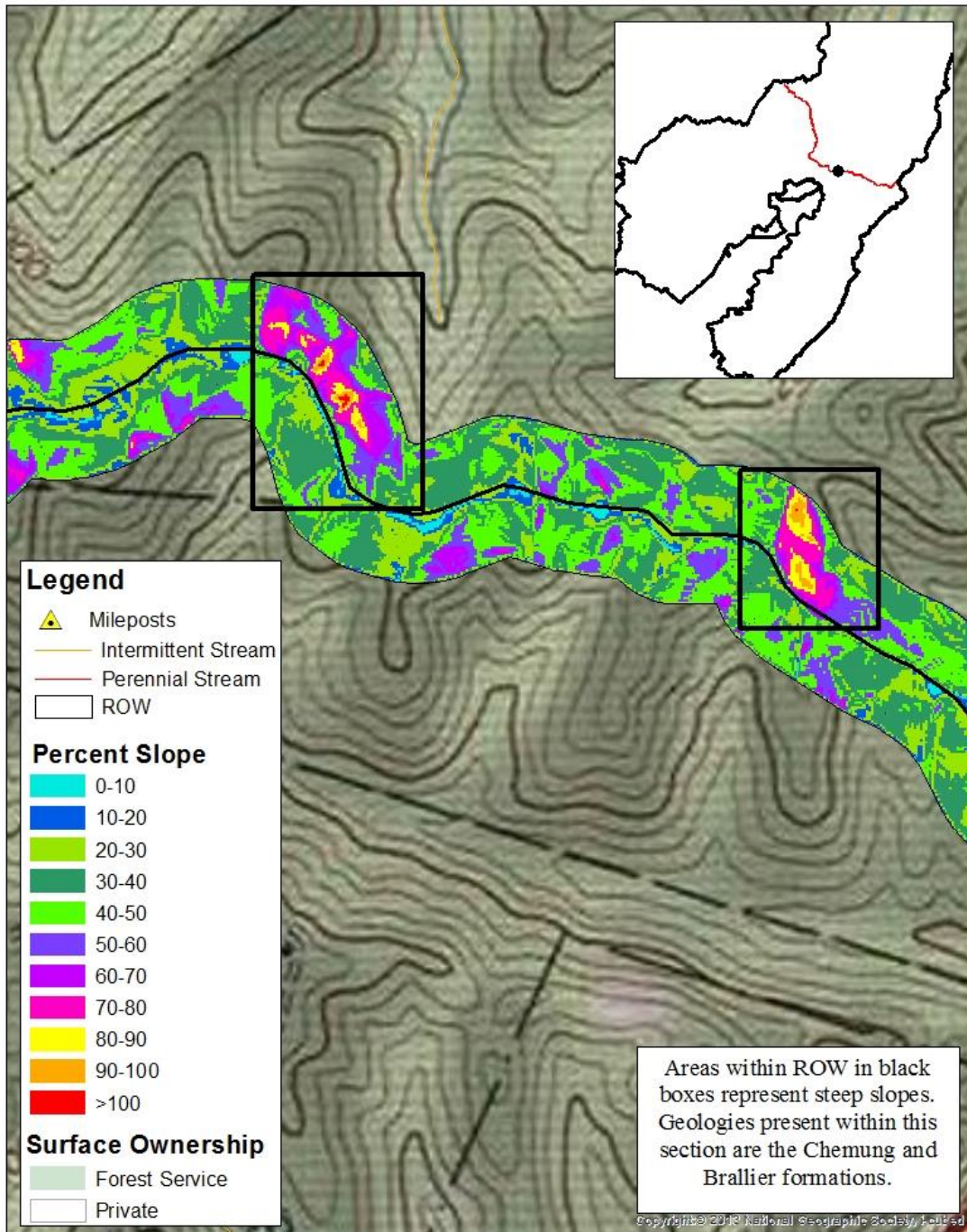
Attachment A:



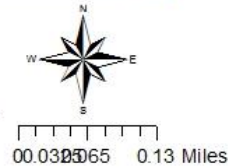
Attachment B:



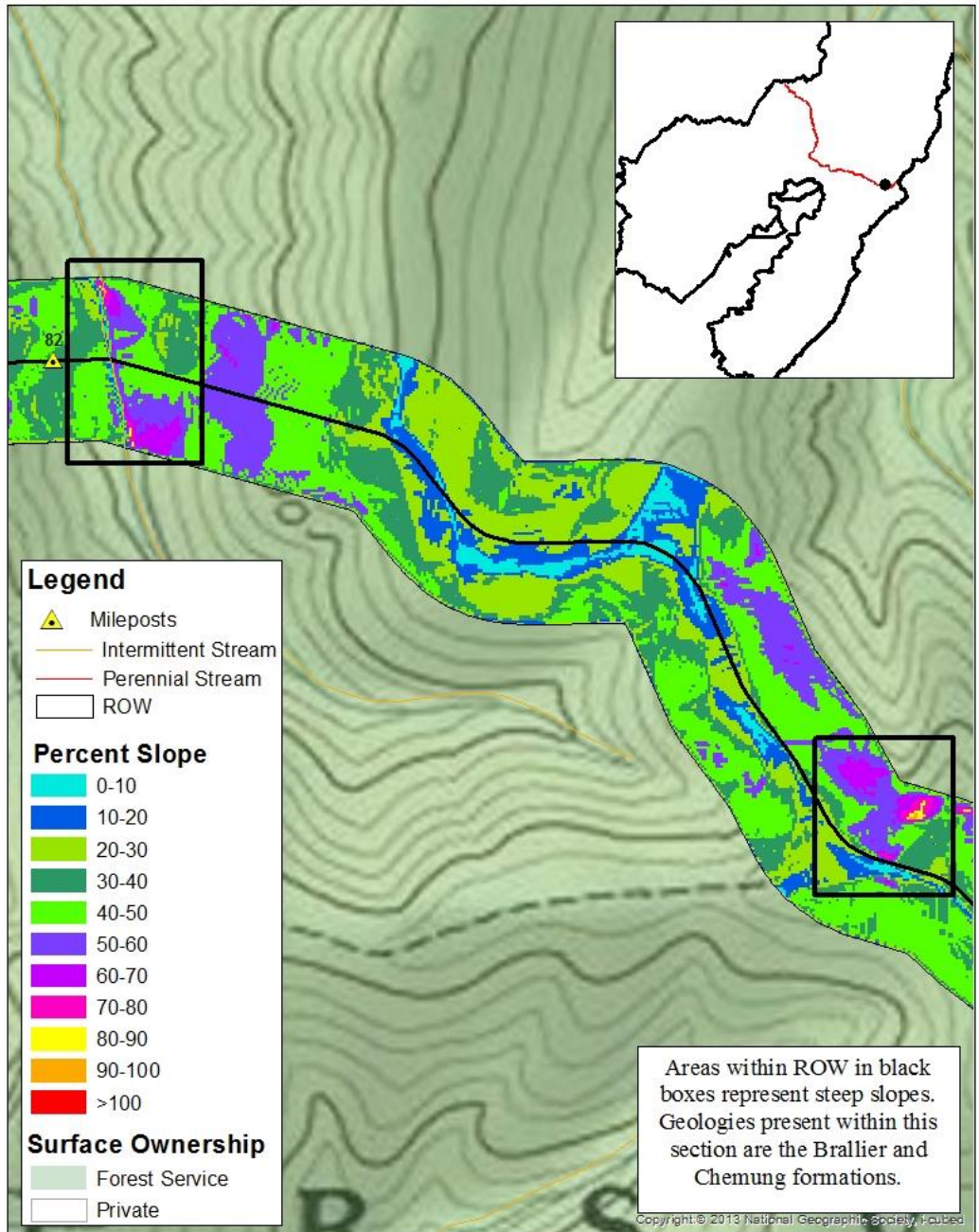
Attachment C:



ACP MP 78 to MP 79
Monongahela National Forest
Original data was compiled from multiple source data and may not meet the U.S. National Mapping Accuracy Standard of the Office of Management and Budget. This map has no warranties as to its contents or accuracy.



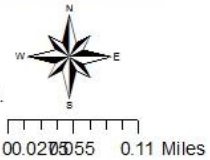
Attachment D:



ACP MP 82 to MP 83

Monongahela National Forest

Original data was compiled from multiple source data and may not meet the U.S. National Mapping Accuracy Standard of the Office of Management and Budget. This map has no warranties as to its contents or accuracy.



Document Content(s)

FSrequest_ACP_site-specific design.PDF.....1-10