

1.0 SECTION 1

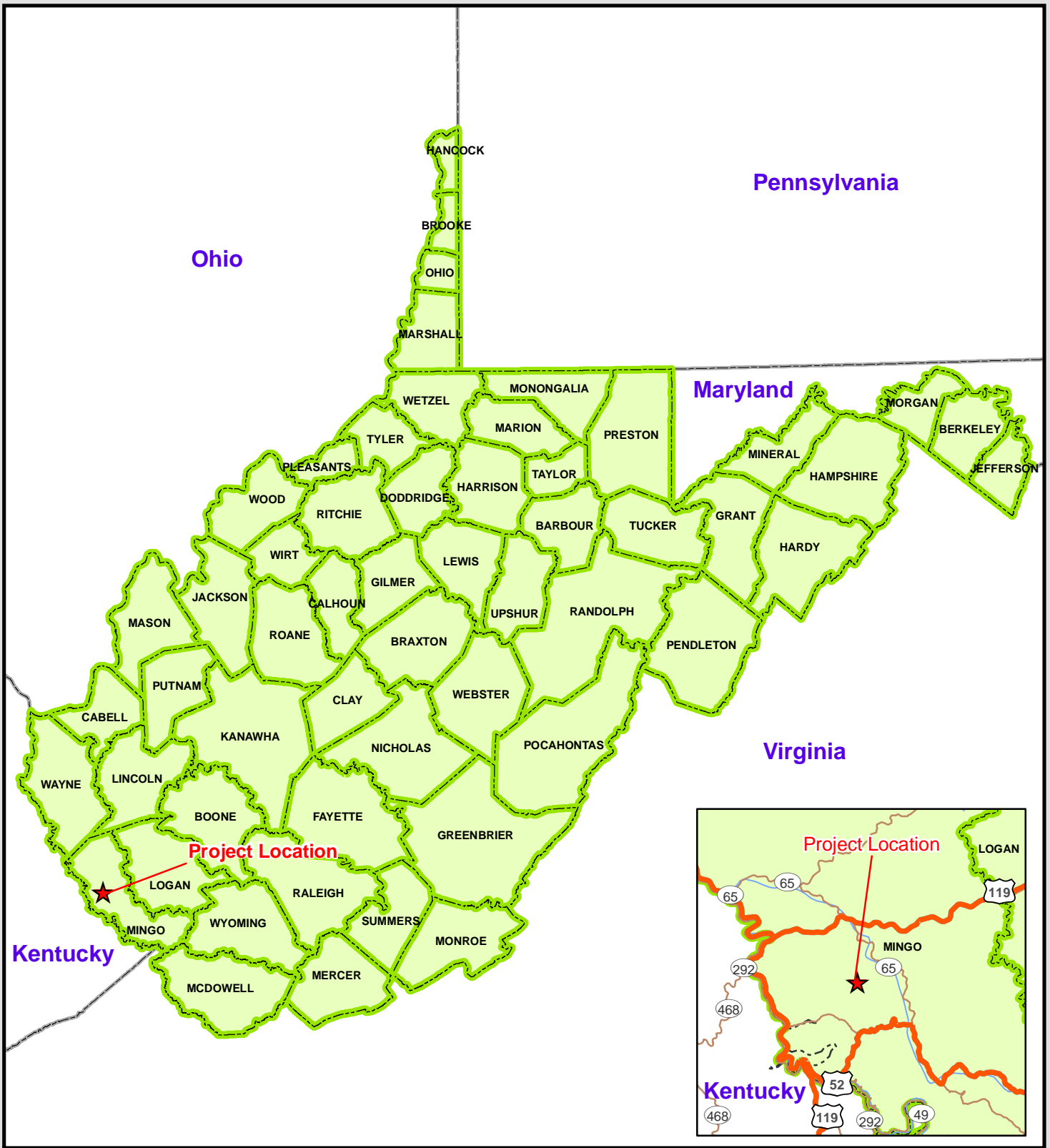
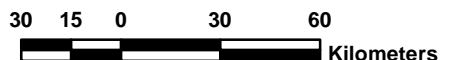
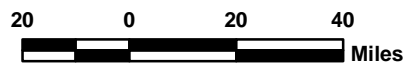
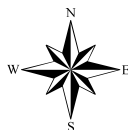


FIGURE 1.1 - PROJECT LOCATION MAP



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 Canonsburg, PA 15317



82°18'0"W

82°16'0"W

82°14'0"W

82°12'0"W

37°46'0"N

37°46'0"N

37°44'0"N

37°44'0"N

37°42'0"N

37°42'0"N

82°16'0"W

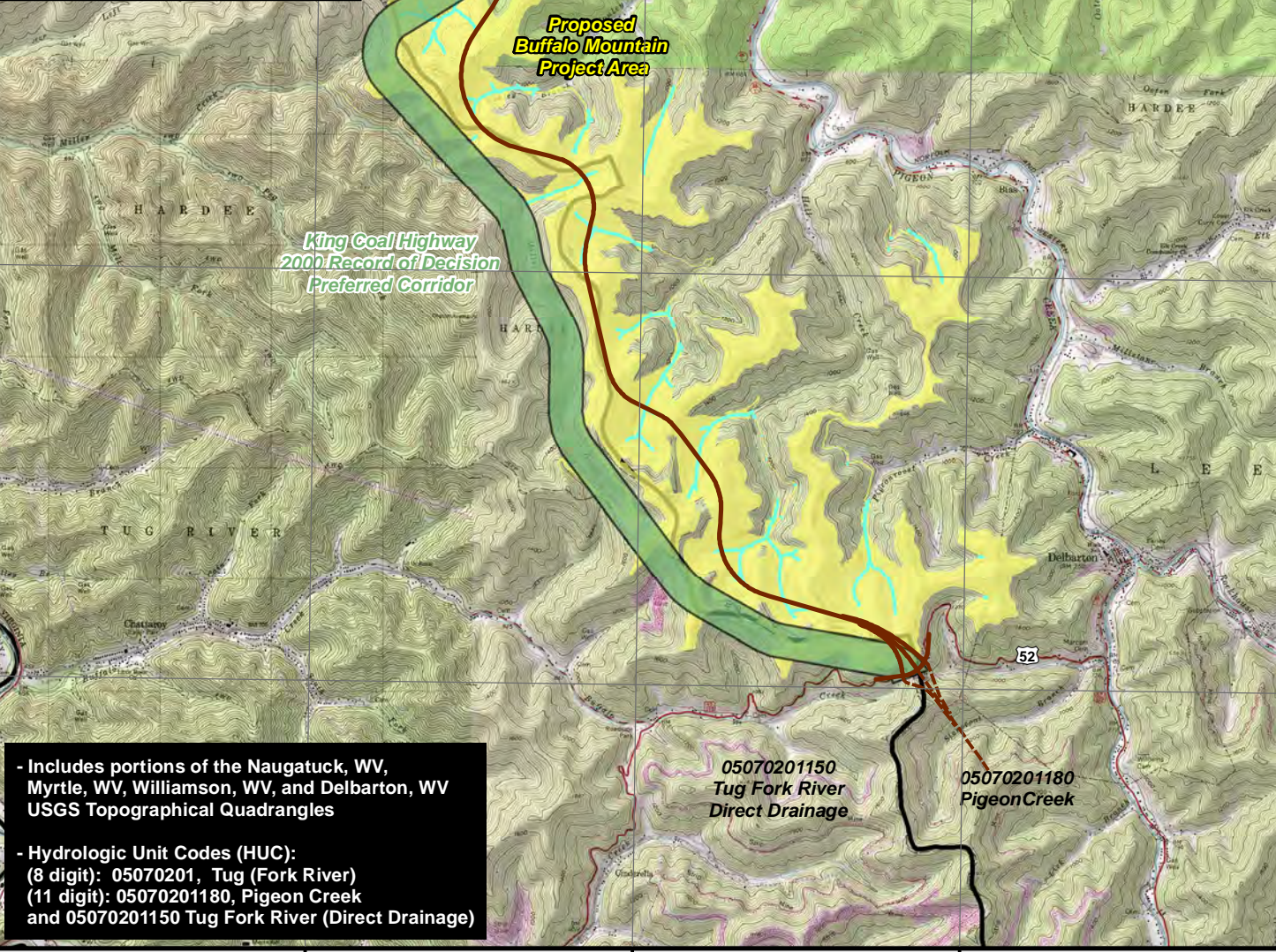
82°14'0"W

82°12'0"W



Hydrologic Unit Code (HUC) Index

HUC (8 digit) HUC (11 digit)



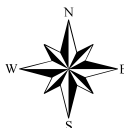
- Includes portions of the Naugatuck, WV, Myrtle, WV, Williamson, WV, and Delbarton, WV USGS Topographical Quadrangles
- Hydrologic Unit Codes (HUC):
 (8 digit): 05070201, Tug (Fork River)
 (11 digit): 05070201180, Pigeon Creek
 and 05070201150 Tug Fork River (Direct Drainage)

FIGURE 1.2 - TOPOGRAPHICAL MAP OF PROPOSED IMPACT AREAS



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Proposed Impact Reach



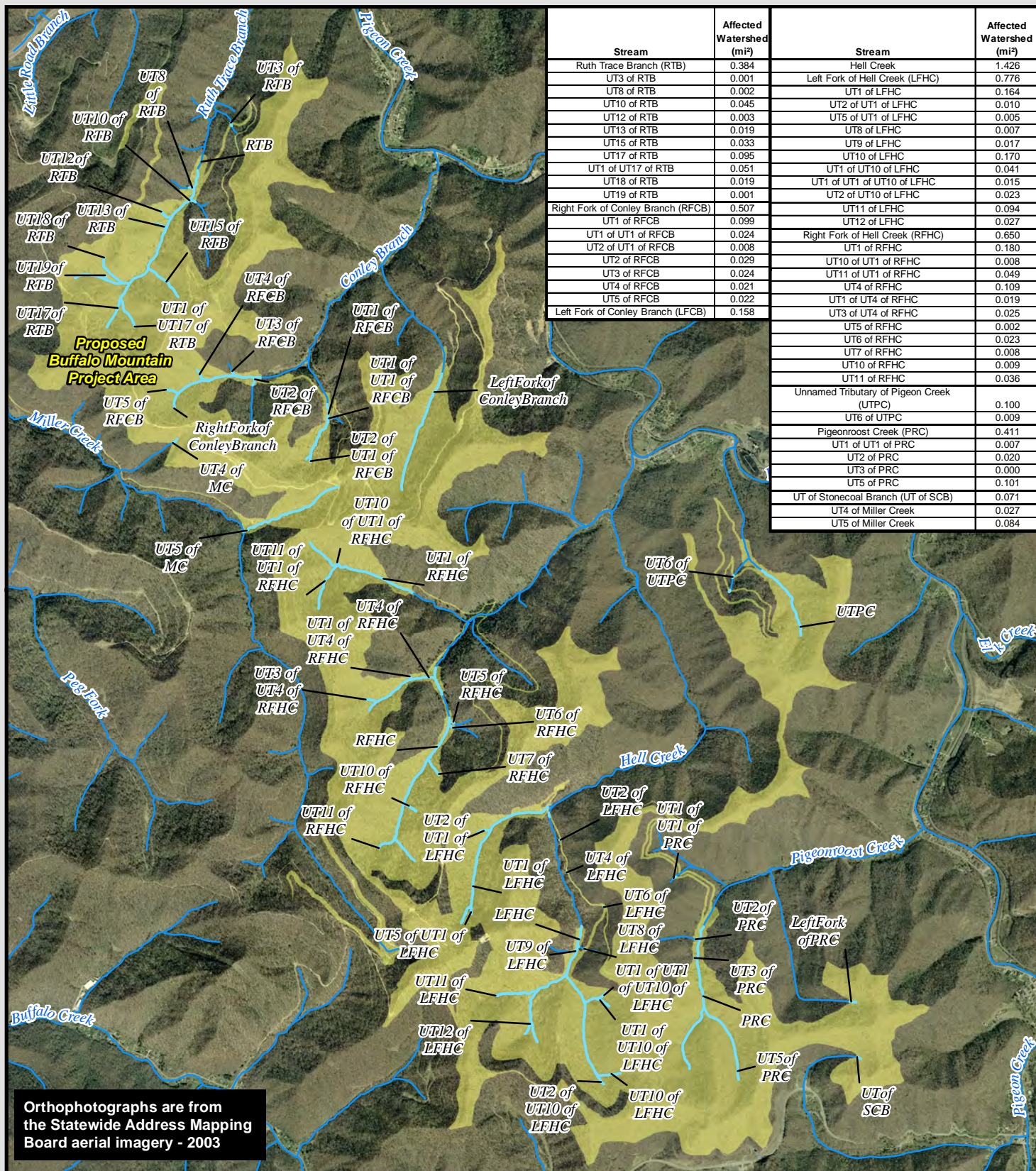
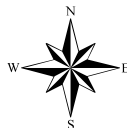


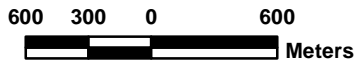
FIGURE 1.3 - AERIAL MAP OF PROPOSED IMPACT AREAS



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Proposed Impact Reach



Orthophotographs are from the Statewide Address Mapping Board aerial imagery - 2003

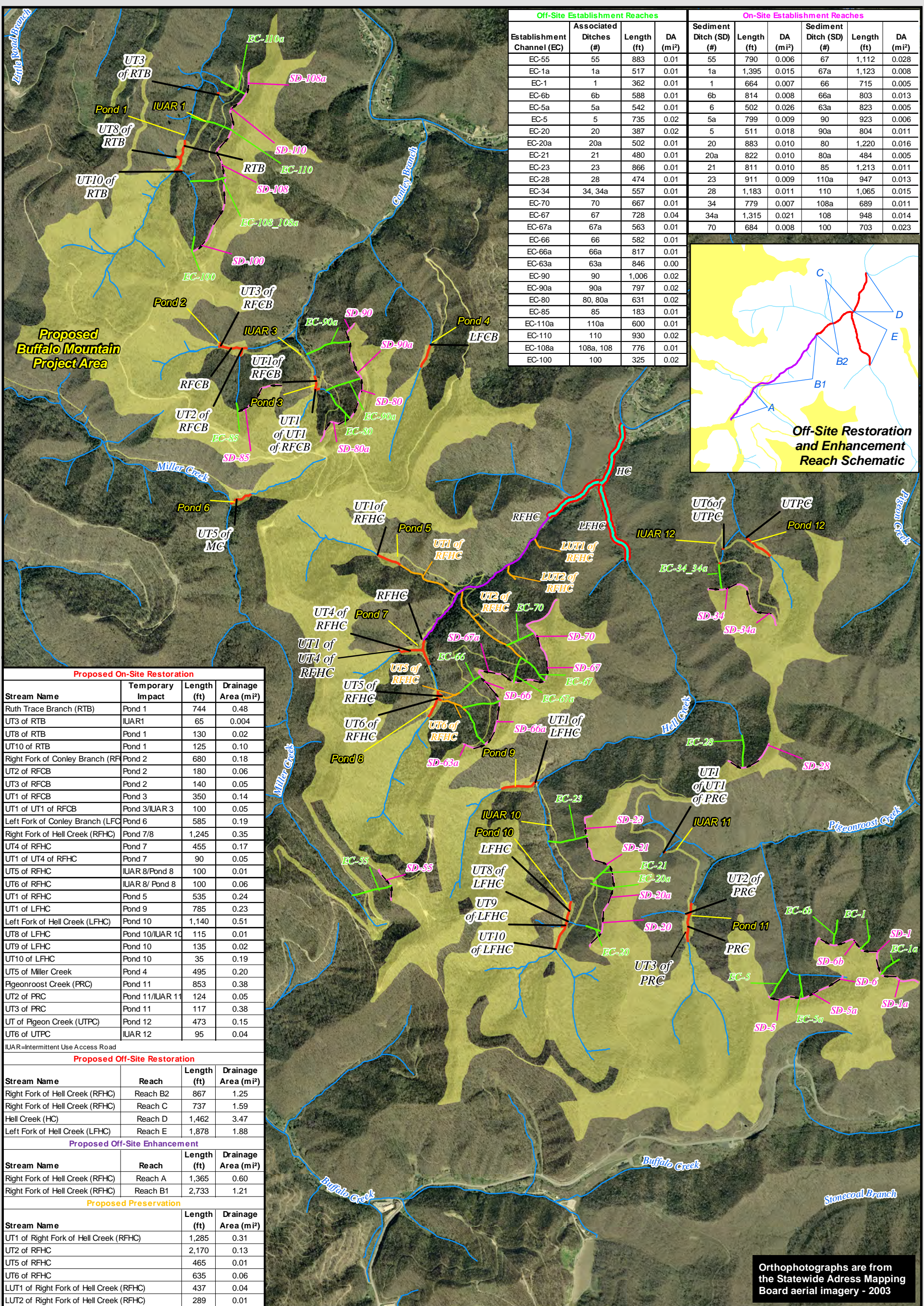
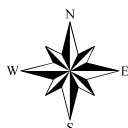
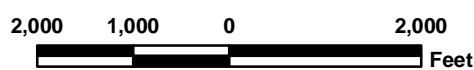


FIGURE 1.4 - AERIAL MAP OF PROPOSED MITIGATION AREAS

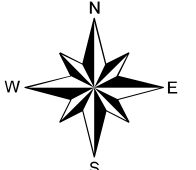
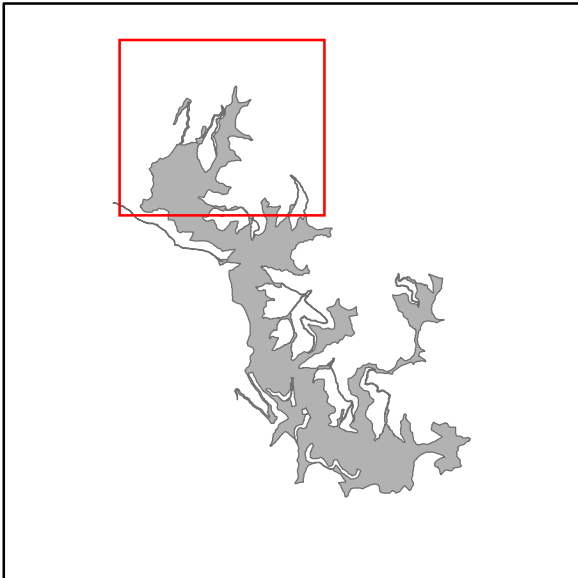
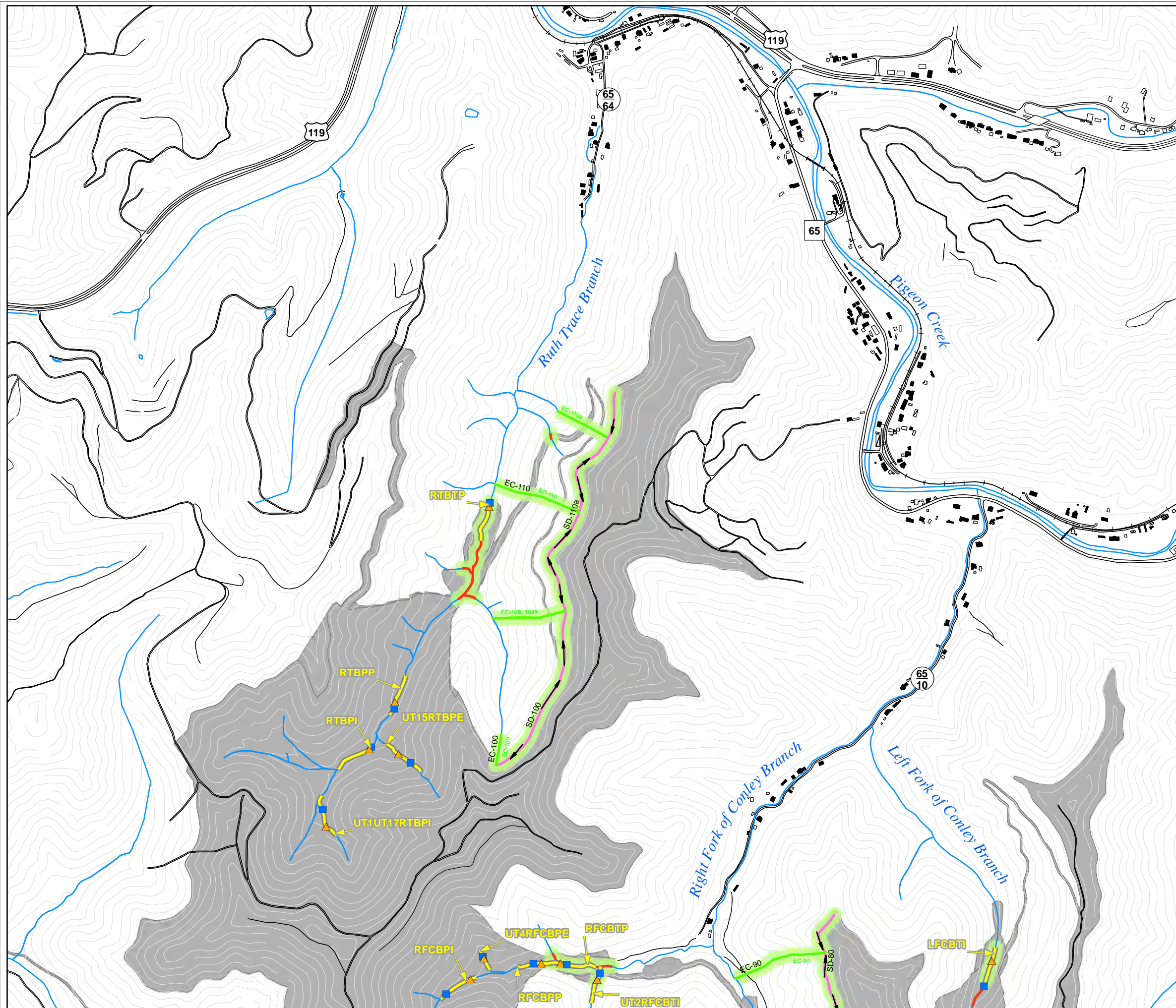


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- Proposed Off-Site Enhancement Reach
- Proposed Off-Site Restoration and Water Quality Reach
- Proposed Preservation Reach
- Proposed On-Site Restoration Reach
- Proposed On-Site Establishment Reach
- Proposed Off-Site Establishment Reach

Orthophotographs are from the Statewide Address Mapping Board aerial imagery - 2003



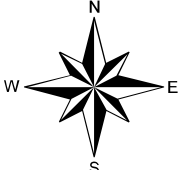
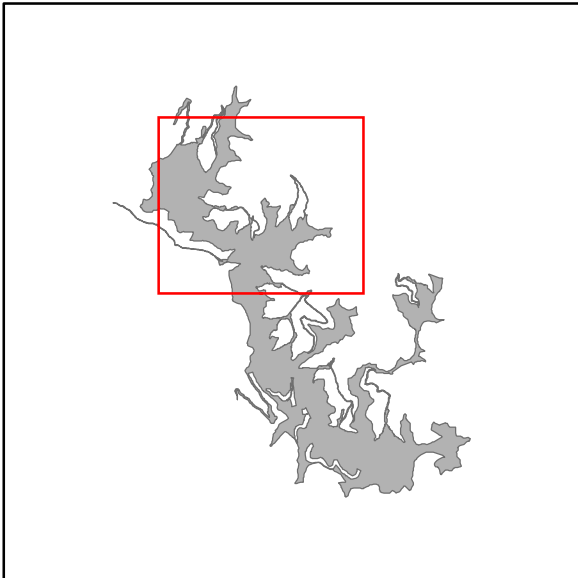
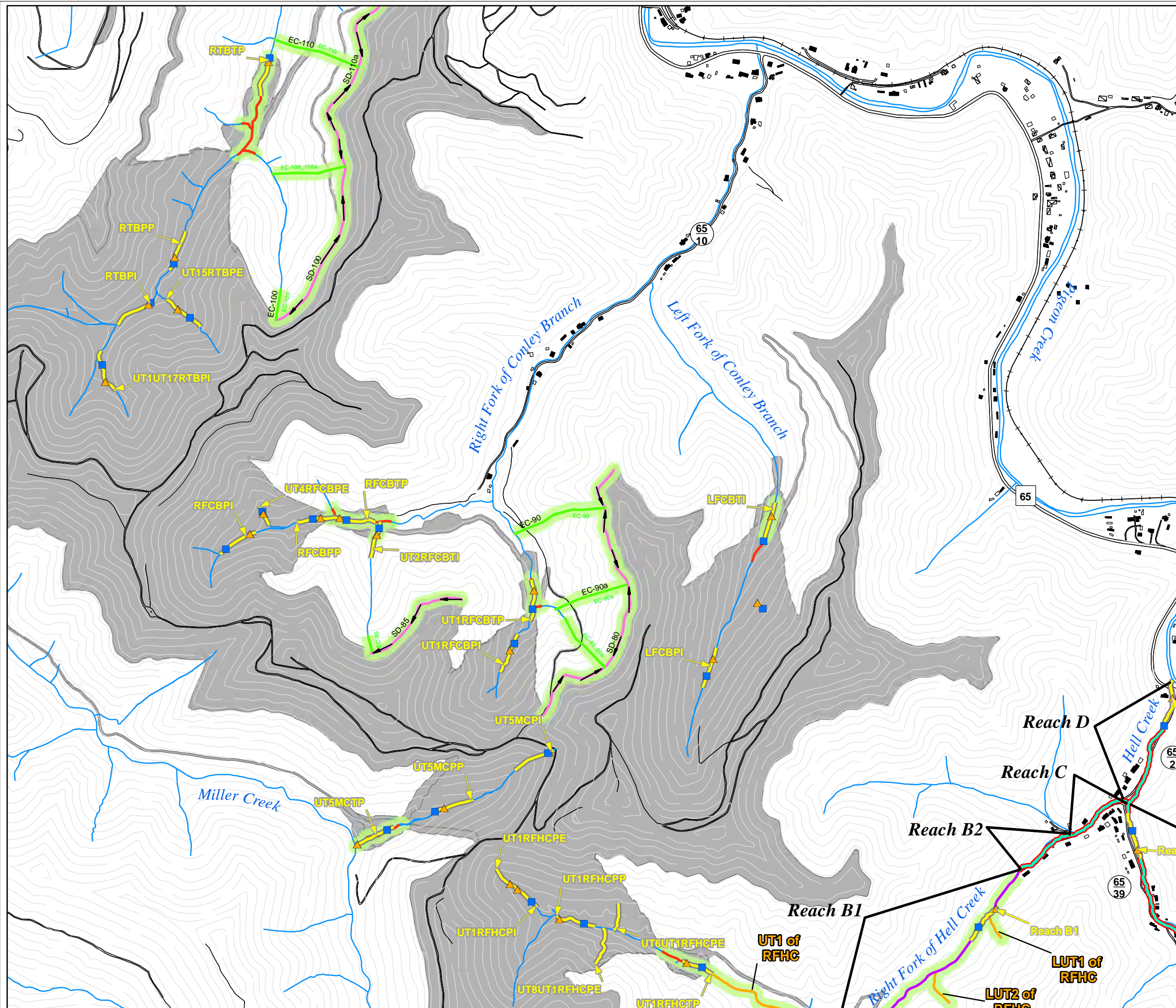
Legend

- Proposed Off-Site Establishment Reach*
- Proposed Off-Site Restoration and Water Quality Reach*
- Proposed On-Site Restoration Reach*
- Proposed On-Site Establishment Reach*
- Proposed Off-Site Establishment Reach*
- Proposed Preservation Reach*
- Assessment Reaches
- Pool Cross-Section
- Riffle Cross-Section

*Each reach includes Riparian Buffers proposed to be 75 ft from each stream bank

Figure 1.5 - Ruth Trace Branch Assessment Reaches and Mitigation Areas





Legend

- ▬ Proposed Off-Site Enhancement Reach*
- ▬ Proposed Off-Site Restoration and Water Quality Reach*
- ▬ Proposed On-Site Restoration Reach*
- ▬ Proposed On-Site Establishment Reach*
- ▬ Proposed Off-Site Establishment Reach*
- ▬ Proposed Preservation Reach*
- ▬ Assessment Reaches
- Pool Cross-Section
- ▲ Riffle Cross-Section

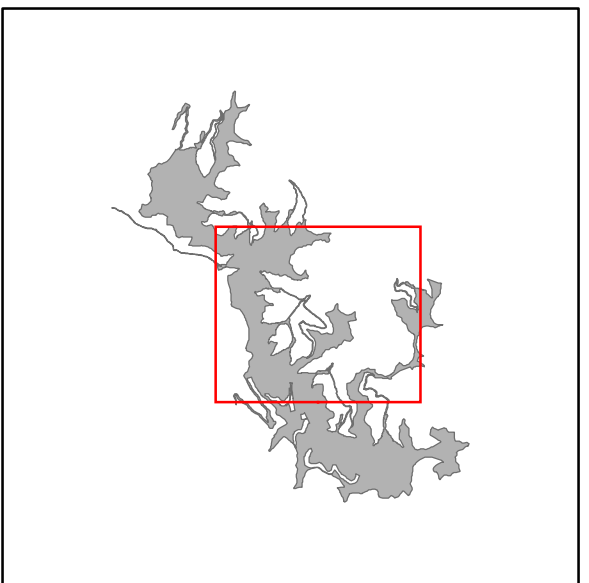
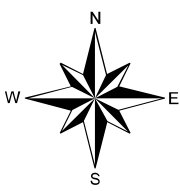
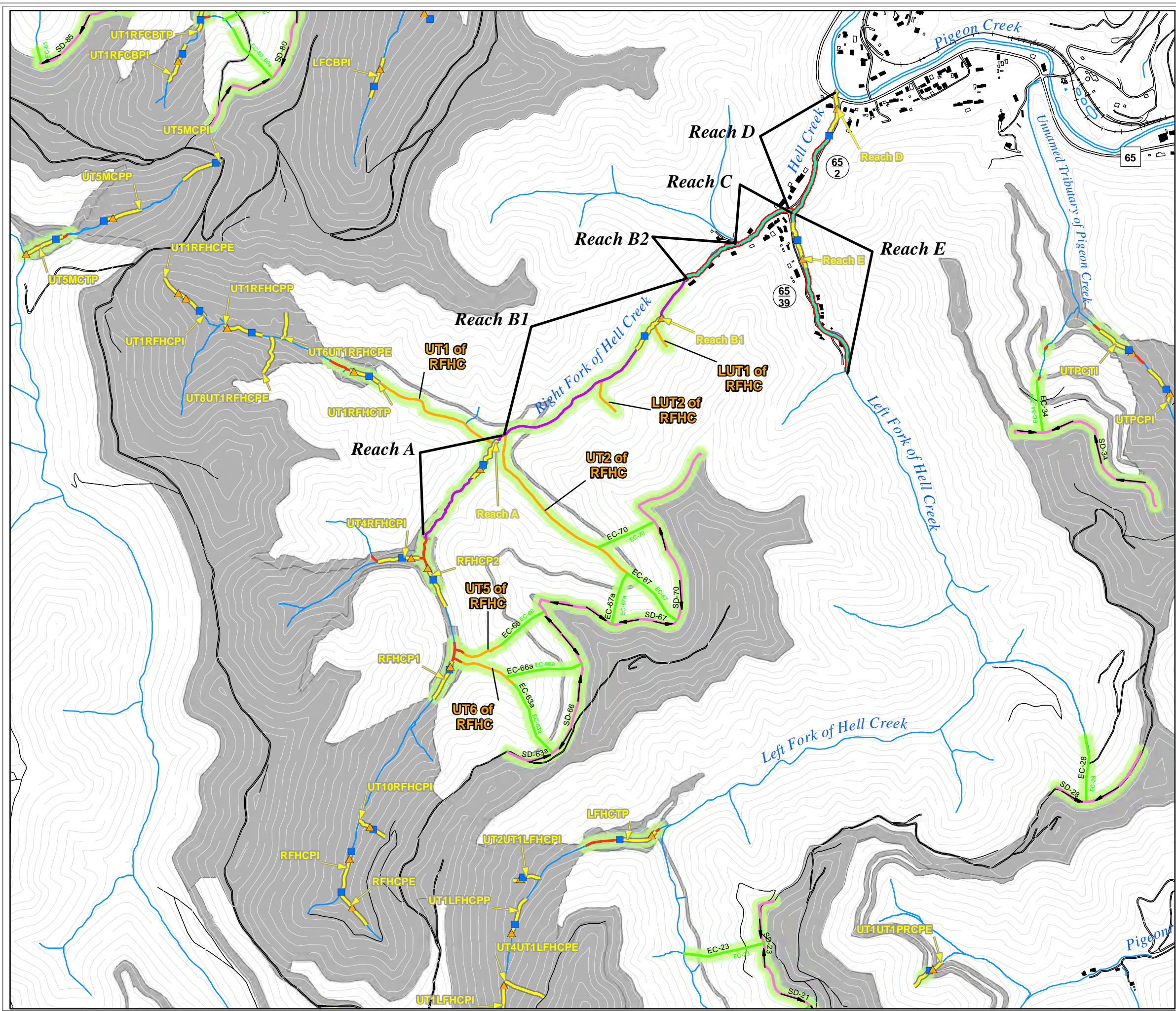
*Each reach includes Riparian Buffers proposed to be 75 ft from each stream bank

**Figure 1.6 - Conley Branch
Assessment Reaches and Mitigation Areas**

1,000 0 1,000

 Feet

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Proposed Off-Site Restoration			
Stream Name	Reach	Length (ft)	Drainage Area (mi ²)
Right Fork of Hell Creek	Reach B2	867	1.25
Right Fork of Hell Creek	Reach C	737	1.59
Hell Creek	Reach D	1,462	3.47
Left Fork of Hell Creek	Reach E	1,878	1.88

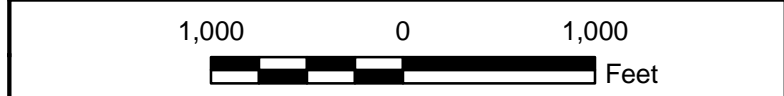
Proposed Off-Site Enhancement			
Stream Name	Reach	Length (ft)	Drainage Area (mi ²)
Right Fork of Hell Creek	Reach A	1,318	0.60
Right Fork of Hell Creek	Reach B1	2,733	1.21

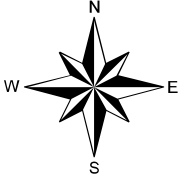
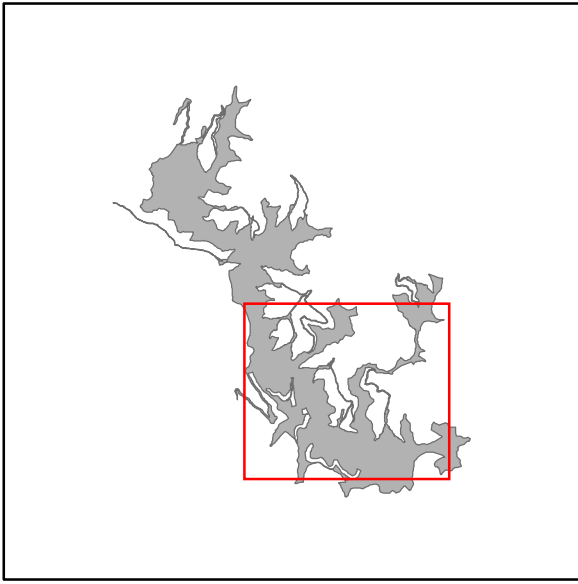
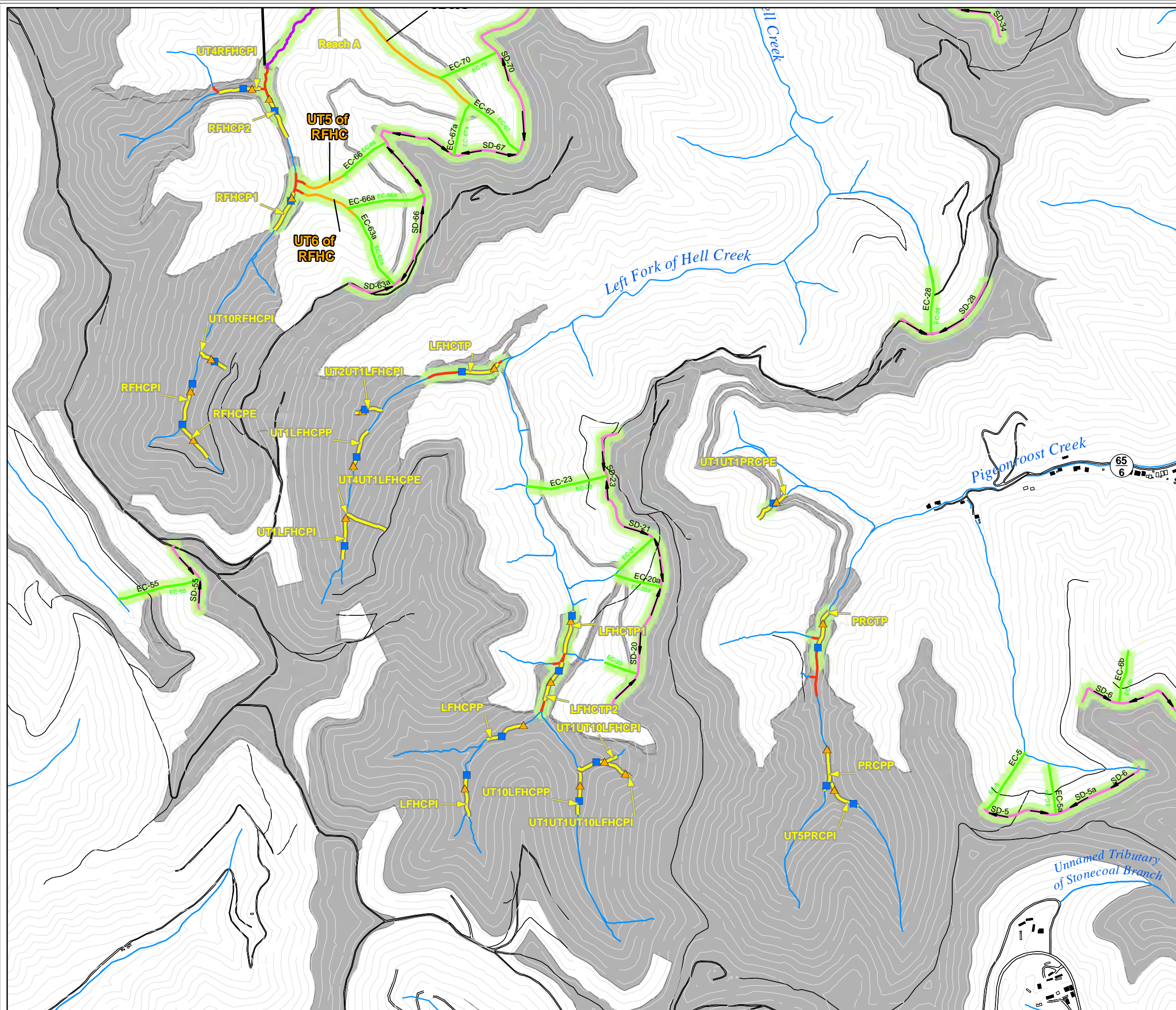
Legend

- Proposed Off-Site Enhancement Reach*
- Proposed Off-Site Restoration and Water Quality Reach*
- Proposed On-Site Restoration Reach*
- Proposed On-Site Establishment Reach*
- Proposed Off-Site Establishment Reach*
- Proposed Preservation Reach*
- Assessment Reaches
- Pool Cross-Section
- Riffle Cross-Section

*Each reach includes Riparian Buffers proposed to be 75 ft from each stream bank

Figure 1.7 - Right Fork of Hell Creek Assessment Reaches and Mitigation Areas





Legend

- Proposed Off-Site Enhancement Reach*
- Proposed Off-Site Restoration and Water Quality Reach*
- Proposed On-Site Restoration Reach*
- Proposed On-Site Establishment Reach*
- Proposed Off-Site Establishment Reach*
- Proposed Preservation Reach*
- Assessment Reaches
- Pool Cross-Section
- ▲ Riffle Cross-Section

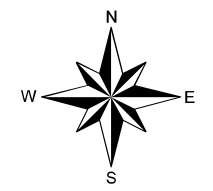
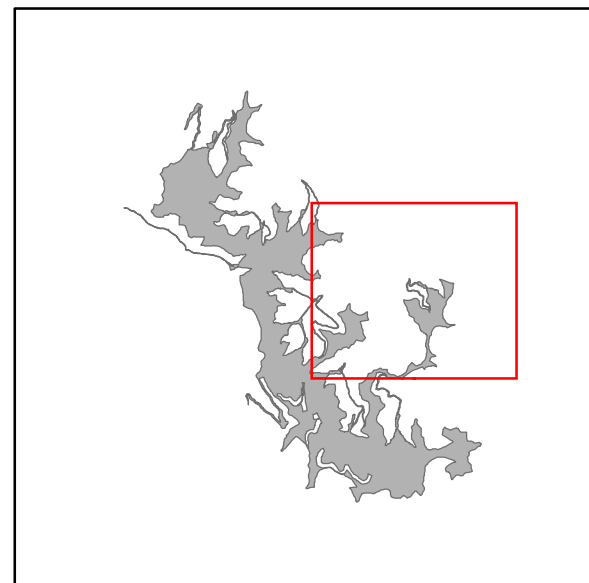
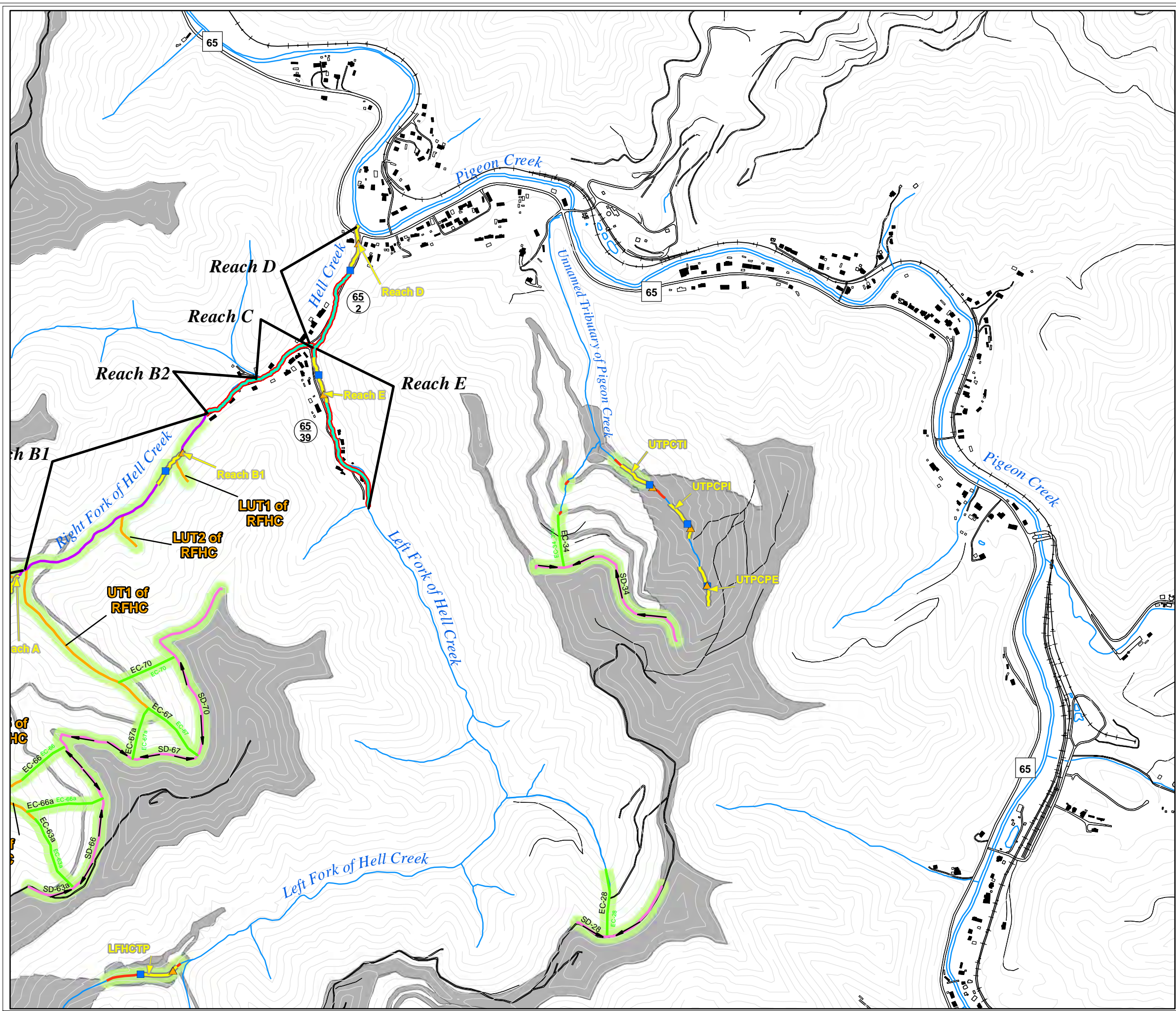
*Each reach includes Riparian Buffers proposed to be 75 ft from each stream bank

**Figure 1.8 - Left Fork of Hell Creek
Assessment Reaches and Mitigation Areas**

1,000 0 1,000

 Feet

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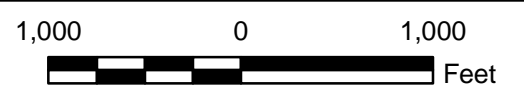


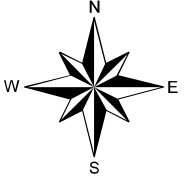
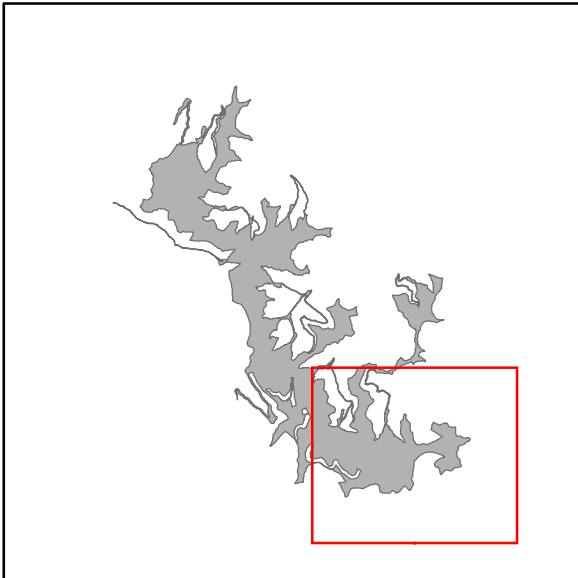
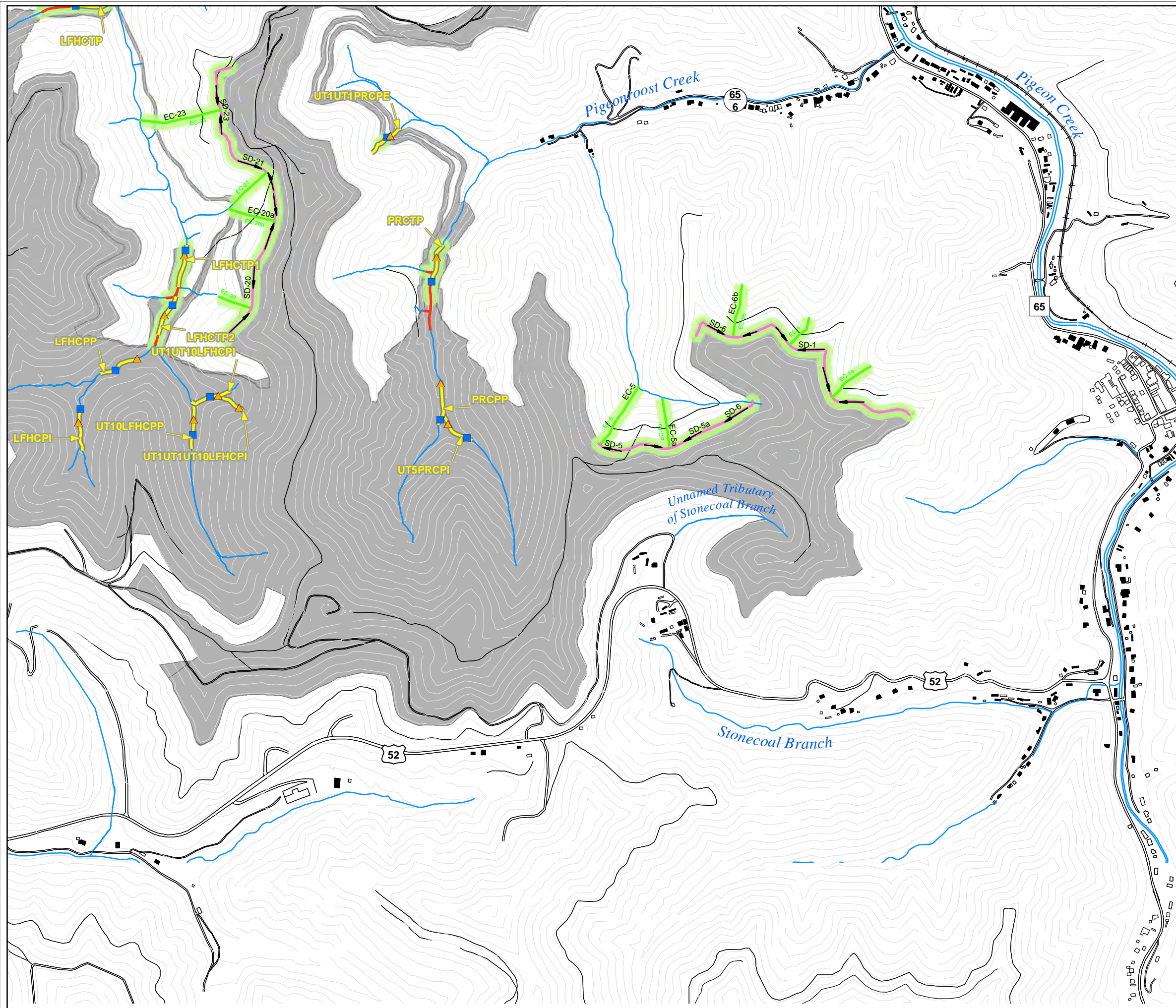
Legend

- Proposed Off-Site Enhancement Reach*
- Proposed Off-Site Restoration and Water Quality Reach*
- Proposed On-Site Restoration Reach*
- Proposed On-Site Establishment Reach*
- Proposed Off-Site Establishment Reach*
- Proposed Preservation Reach*
- Assessment Reaches
- Pool Cross-Section
- ▲ Riffle Cross-Section

*Each reach includes Riparian Buffers proposed to be 75 ft from each stream bank

Figure 1.10 - Unnamed Tributary to Pigeon Creek Assessment Reaches and Mitigation Areas





Legend

- Proposed Off-Site Establishment Reach*
- Proposed Off-Site Restoration and Water Quality Reach*
- Proposed On-Site Restoration Reach*
- Proposed On-Site Establishment Reach*
- Proposed Off-Site Establishment Reach*
- Proposed Preservation Reach*
- Assessment Reaches
- Pool Cross-Section
- Riffle Cross-Section

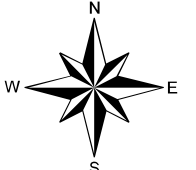
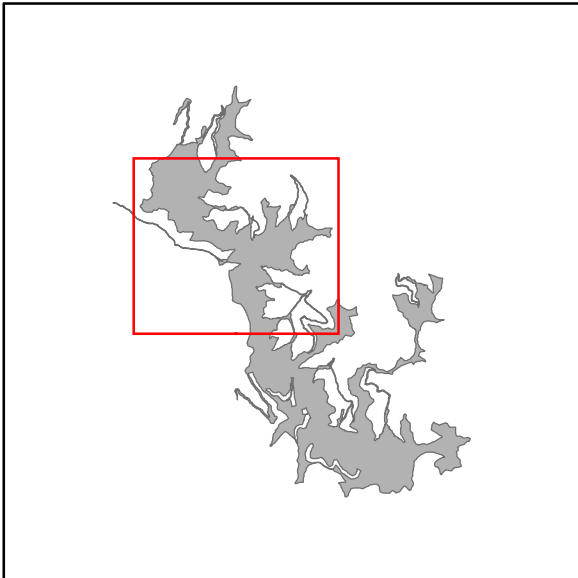
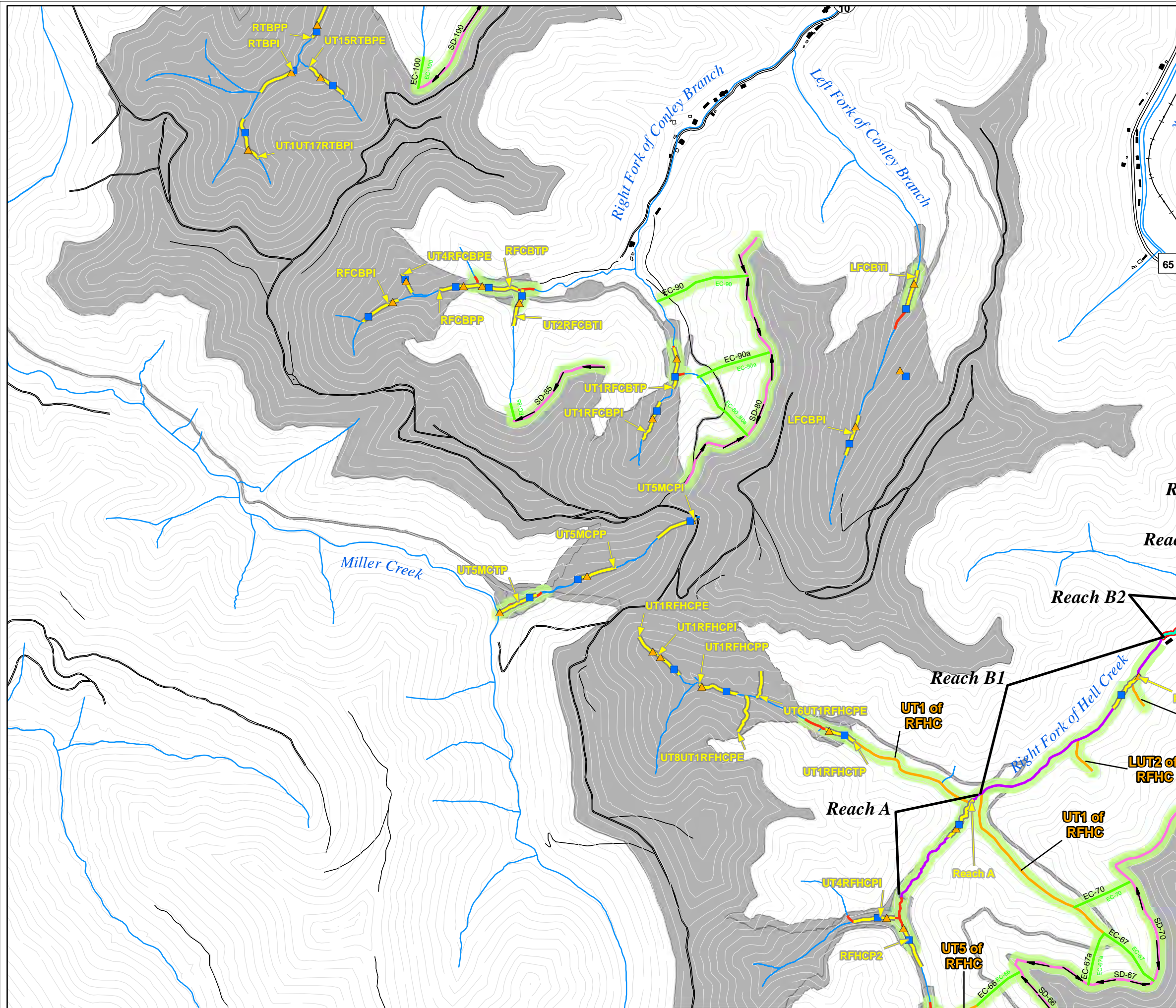
*Each reach includes Riparian Buffers proposed to be 75 ft from each stream bank

Figure 1.11 - Unnamed Tributary to Stonecoal Branch
Assessment Reaches and Mitigation Areas

1,000 0 1,000

Feet

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Legend

- Proposed Off-Site Enhancement Reach*
- Proposed Off-Site Restoration and Water Quality Reach*
- Proposed On-Site Restoration Reach*
- Proposed On-Site Establishment Reach*
- Proposed Off-Site Establishment Reach*
- Proposed Preservation Reach*
- Assessment Reaches
- Pool Cross-Section
- Riffle Cross-Section

*Each reach includes Riparian Buffers proposed to be 75 ft from each stream bank

Figure 1.12 - Unnamed Tributary to Miller Creek Assessment Reaches and Mitigation Areas

1,000 0 1,000
Feet

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Orthophotographs are from the Statewide Address Mapping Board aerial imagery - 2003

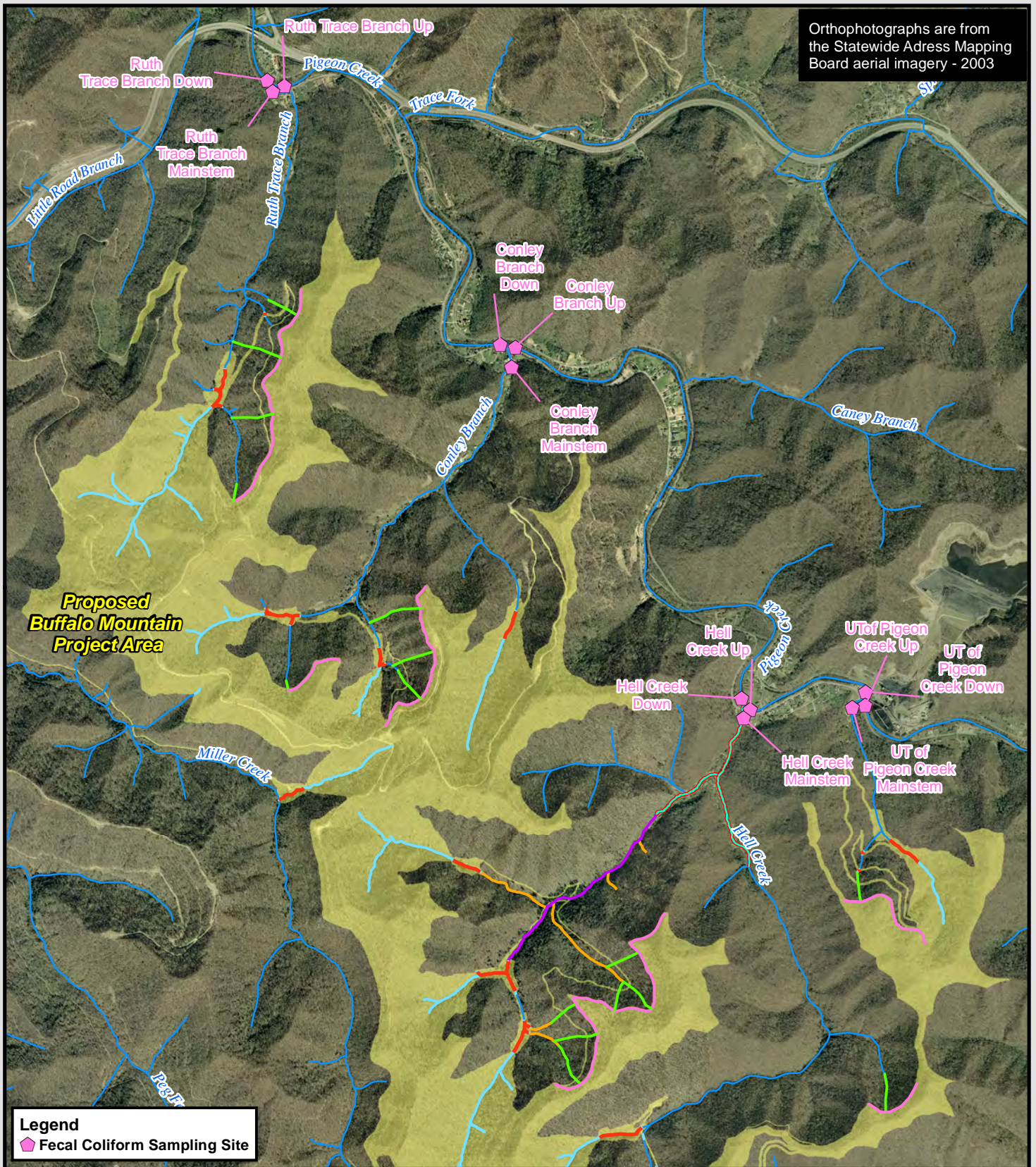
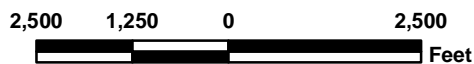
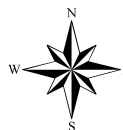


FIGURE 1.13 - AERIAL MAP OF FECAL COLIFORM ASSESSMENT SITES



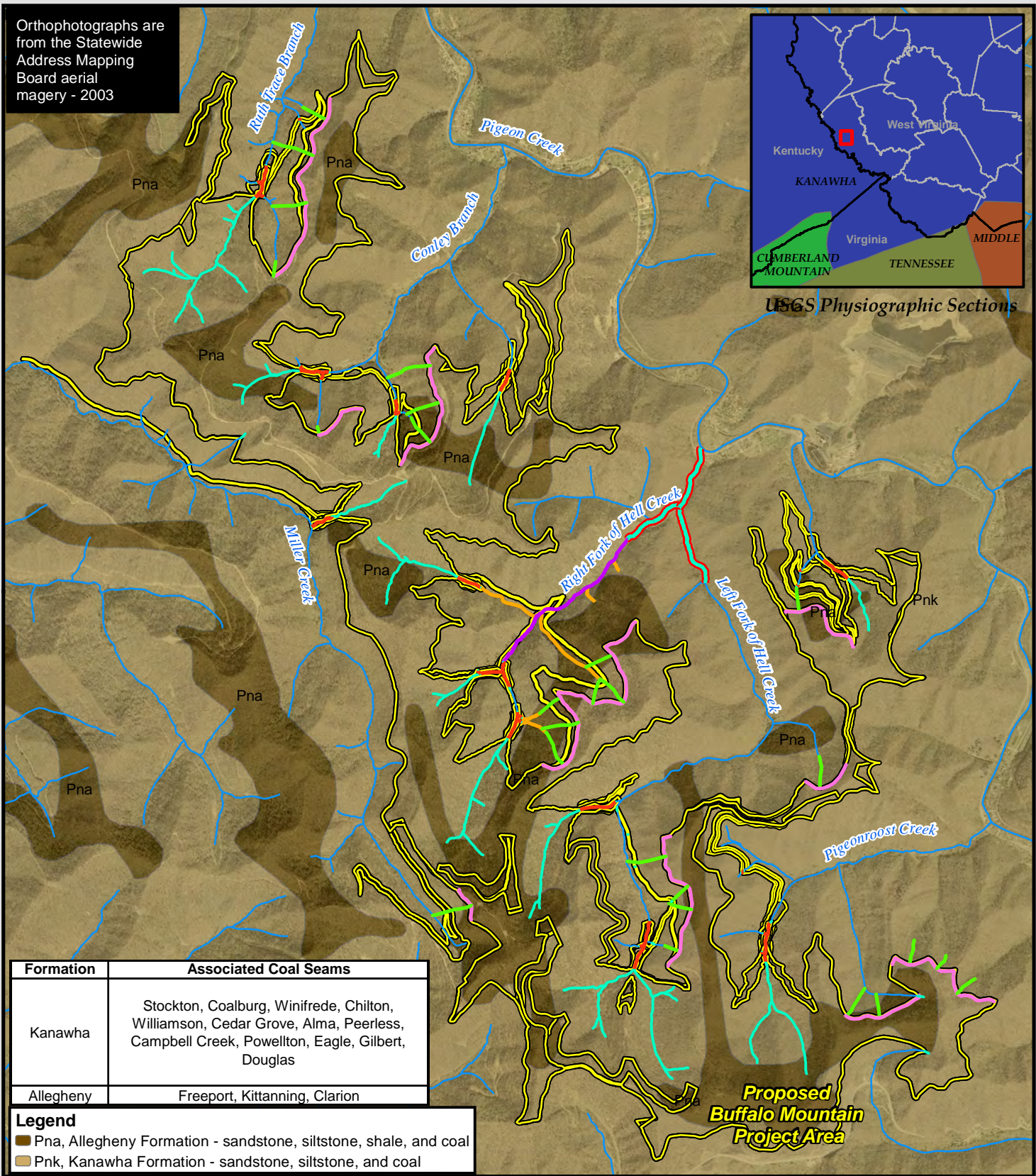
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- Proposed Impact Reach
- Proposed Off-Site Enhancement Reach
- Proposed Off-Site Restoration and Water Quality Reach
- Proposed On-Site Restoration Reach
- Proposed Off-Site Establishment Reach
- Proposed On-Site Establishment Reach
- Proposed Preservation Reach

2.0 SECTION 2

Orthophotographs are from the Statewide Address Mapping Board aerial magery - 2003

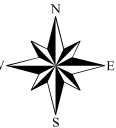


Formation	Associated Coal Seams
Kanawha	Stockton, Coalburg, Winifrede, Chilton, Williamson, Cedar Grove, Alma, Peerless, Campbell Creek, Powellton, Eagle, Gilbert, Douglas
Allegheny	Freeport, Kittanning, Clarion

Legend
 ■ Pna, Allegheny Formation - sandstone, siltstone, shale, and coal
 ■ Pnk, Kanawha Formation - sandstone, siltstone, and coal

FIGURE 2.1 - GEOLOGY MAP OF PROPOSED PROJECT AREA

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-  Proposed Impact Reach
-  Proposed Off-Site Enhancement Reach
-  Proposed Off-Site Restoration and Water Quality Reach
-  Proposed On-Site Restoration Reach
-  Proposed Off-Site Establishment Reach
-  Proposed On-Site Establishment Reach
-  Proposed Preservation Reach

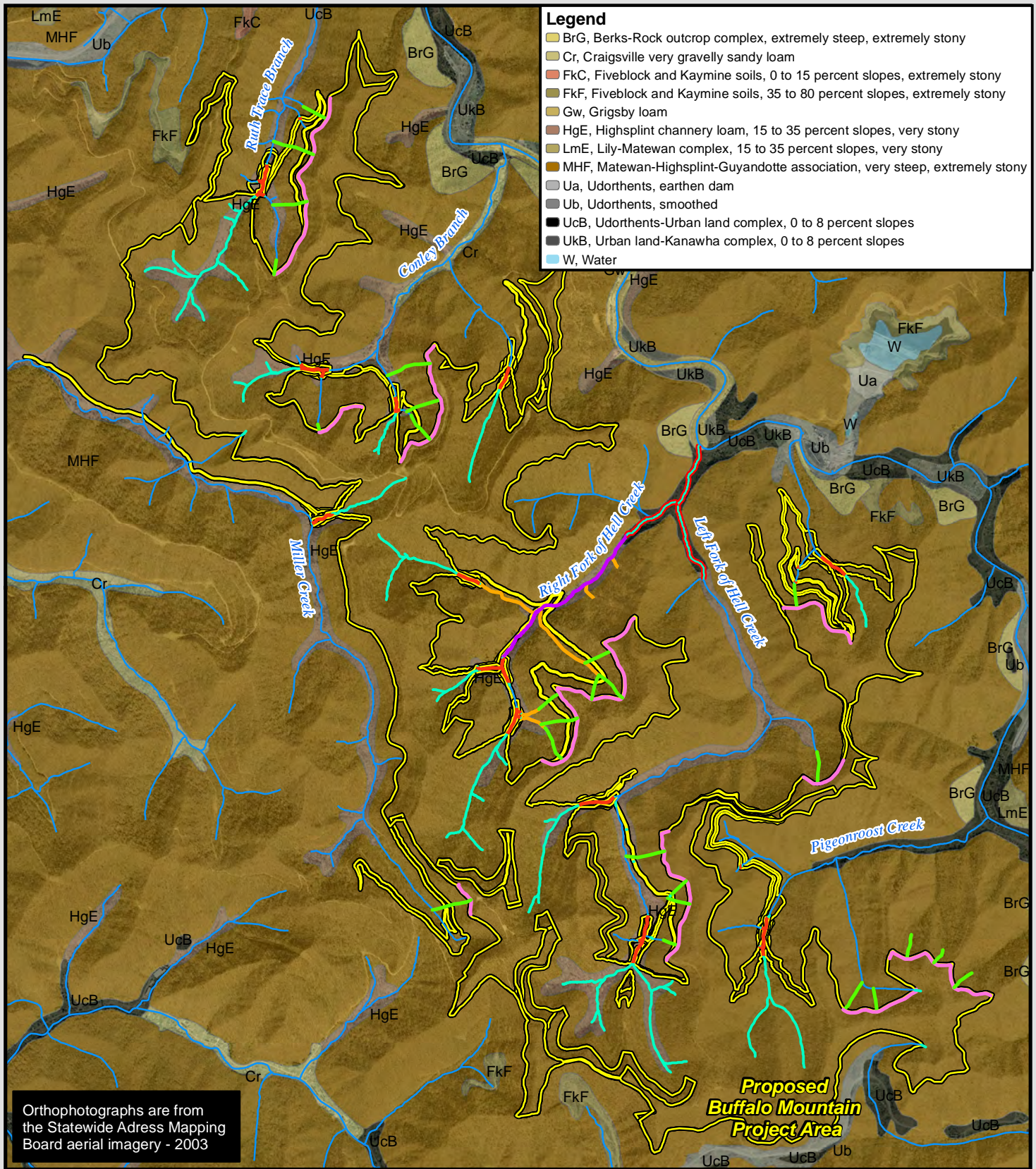
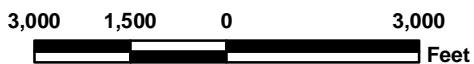
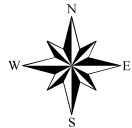


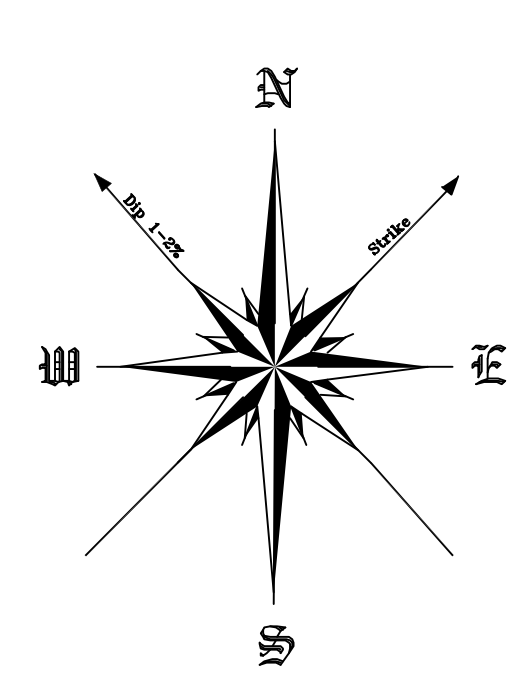
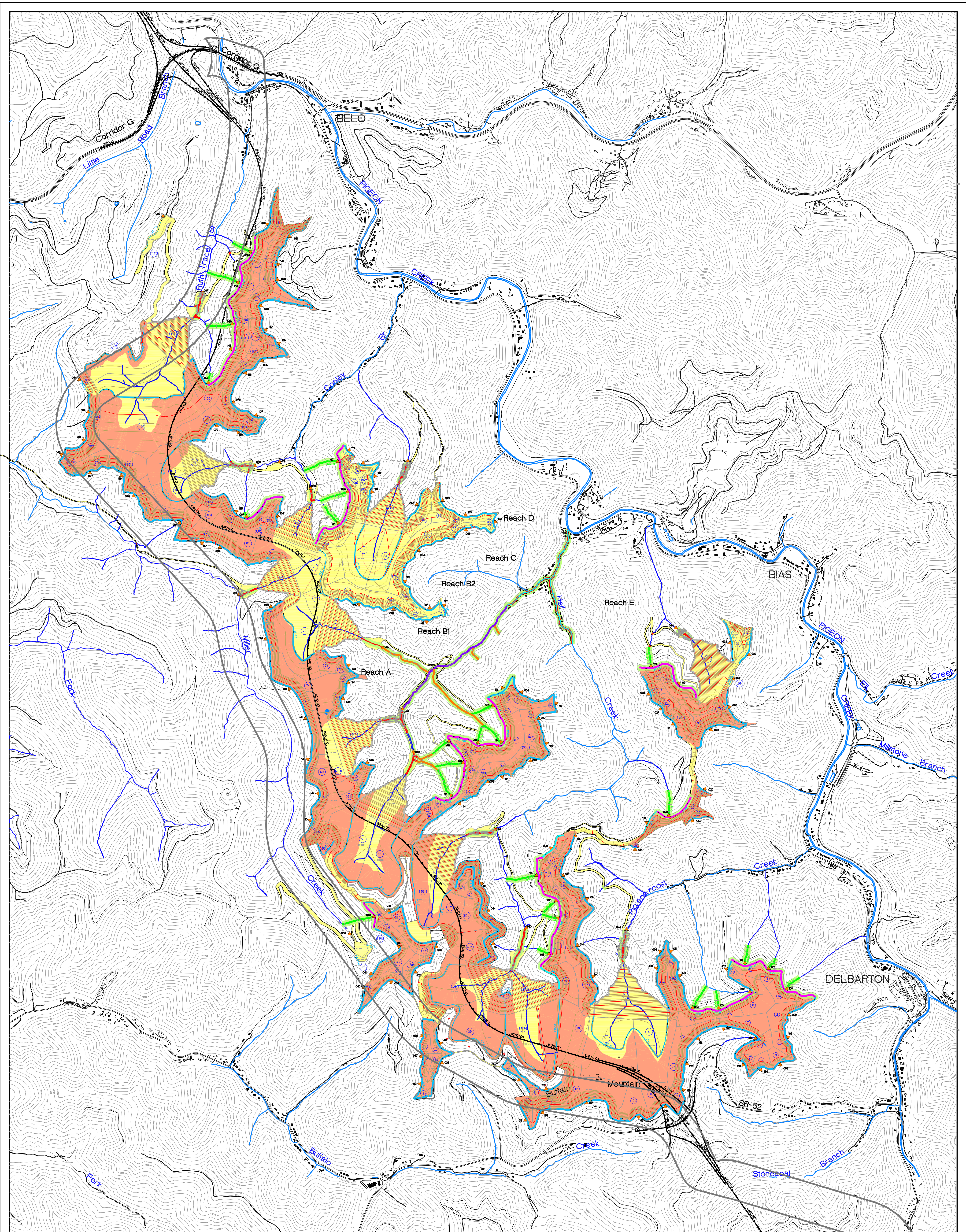
FIGURE 2.2 - SOIL MAP OF PROPOSED PROJECT AREA



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- Proposed Impact Reach
- Proposed Off-Site Enhancement Reach
- Proposed Off-Site Restoration and Water Quality Reach
- Proposed On-Site Restoration Reach
- Proposed Off-Site Establishment Reach
- Proposed On-Site Establishment Reach
- Proposed Preservation Reach



LEGEND	
	USACE Field Verified Jurisdictional Stream
	Stream from USGS Topographic Map
	Mineral Removal Area
	Disturbed Area
	Mining Permit Boundary
	Proposed FHWA EIS Coverage Area
	NPDES Outlet
On-Site Mitigation Options	
	Establishment Channel*
	Restoration Reach*
Off-Site Mitigation Options	
	Establishment Channel*
	Enhancement Reach*
	Preservation Reach*
	Water Quality/Restoration Reach

*Includes 75ft Riparian Buffer Easement On Both Stream Sides

DRAWN		DATE		BY	
03/08		03/08		DWM	
REVISED		DATE		BY	
05/08		05/08		DWM	
07/08		07/08		ALG	
08/08		08/08		CRF	
09/09		09/09		CRF	
12/09		12/09		CRF	

BUFFALO MOUNTAIN SURFACE MINE
On-Site Establishment and
Off-Site Establishment Areas for Mitigation

FIGURE 2.3
CONCEPTUAL MITIGATION PLAN

Mingo County

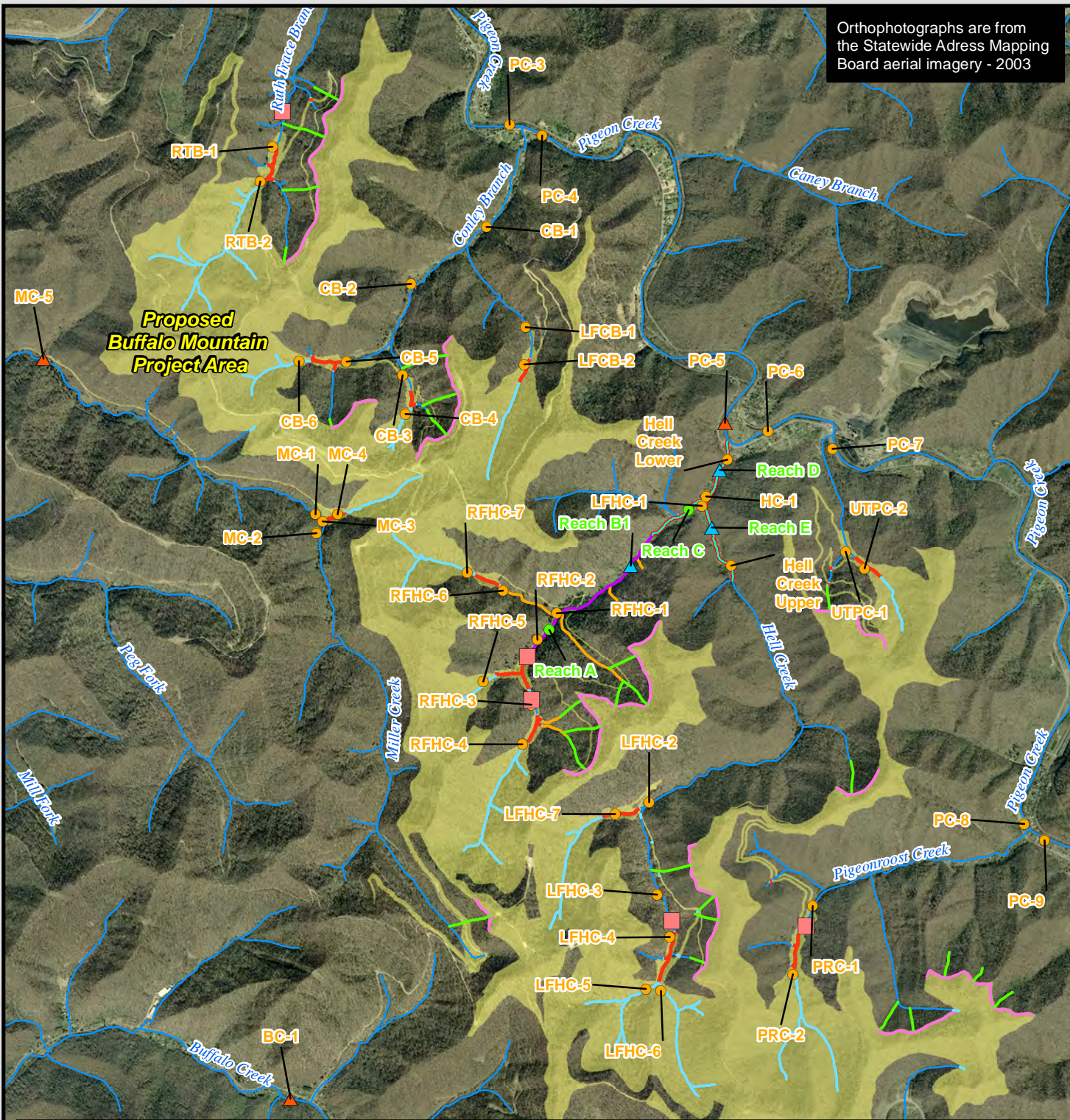
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Path: \\Mining\mine\Projects\Conceal\Buffalo Mountain\CMP\VENUE OUTLET + IMPACT INFORMATION_Oct 2009\Step 3\Map_Figures

Prepared by: MICHAEL BAKER JR., INC.
 5088 West Washington Street
 Charleston, West Virginia, 25303

3.0 SECTION 3

Orthophotographs are from the Statewide Address Mapping Board aerial imagery - 2003



Legend

- Single-Habitat Benthic Macroinvertebrate Sample
- ▲ Fish Survey and Single-Habitat Benthic Macroinvertebrate Sample
- Fish Survey
- Multi-Habitat Benthic Macroinvertebrate Sample
- ▲ Fish Survey and Multi-Habitat Benthic Macroinvertebrate Sample

FIGURE 3.1 - AERIAL MAP OF BIOTIC ASSESSMENT SITES

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- Proposed Impact Reach
- Proposed Off-Site Enhancement Reach
- Proposed Off-Site Restoration and Water Quality Reach
- Proposed On-Site Restoration Reach
- Proposed Off-Site Establishment Reach
- Proposed On-Site Establishment Reach
- Proposed Preservation Reach

82°16'0"W

82°14'0"W

82°12'0"W

37°46'0"N

37°46'0"N

37°44'0"N

37°44'0"N

37°42'0"N

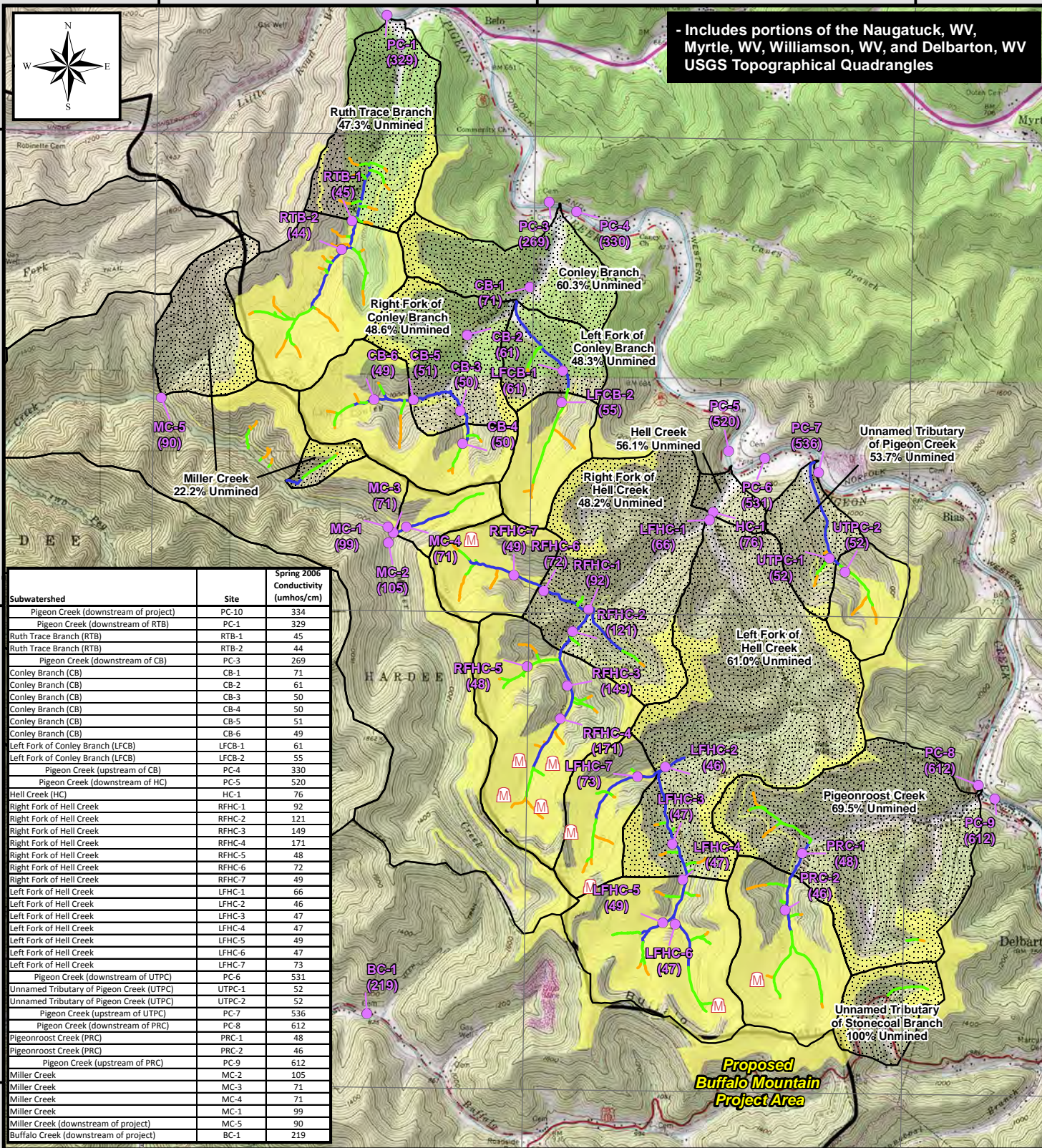
37°42'0"N

82°16'0"W

82°14'0"W

82°12'0"W

- Includes portions of the Naugatuck, WV, Myrtle, WV, Williamson, WV, and Delbarton, WV USGS Topographical Quadrangles



Subwatershed	Site	Spring 2006 Conductivity (umhos/cm)
Pigeon Creek (downstream of project)	PC-10	334
Pigeon Creek (downstream of RTB)	PC-1	329
Ruth Trace Branch (RTB)	RTB-1	45
Ruth Trace Branch (RTB)	RTB-2	44
Pigeon Creek (downstream of CB)	PC-3	269
Conley Branch (CB)	CB-1	71
Conley Branch (CB)	CB-2	61
Conley Branch (CB)	CB-3	50
Conley Branch (CB)	CB-4	50
Conley Branch (CB)	CB-5	51
Conley Branch (CB)	CB-6	49
Left Fork of Conley Branch (LFCB)	LFCB-1	61
Left Fork of Conley Branch (LFCB)	LFCB-2	55
Pigeon Creek (upstream of CB)	PC-4	330
Pigeon Creek (downstream of HC)	PC-5	520
Hell Creek (HC)	HC-1	76
Right Fork of Hell Creek	RFHC-1	92
Right Fork of Hell Creek	RFHC-2	121
Right Fork of Hell Creek	RFHC-3	149
Right Fork of Hell Creek	RFHC-4	171
Right Fork of Hell Creek	RFHC-5	48
Right Fork of Hell Creek	RFHC-6	72
Right Fork of Hell Creek	RFHC-7	49
Left Fork of Hell Creek	LFHC-1	66
Left Fork of Hell Creek	LFHC-2	46
Left Fork of Hell Creek	LFHC-3	47
Left Fork of Hell Creek	LFHC-4	47
Left Fork of Hell Creek	LFHC-5	49
Left Fork of Hell Creek	LFHC-6	47
Left Fork of Hell Creek	LFHC-7	73
Pigeon Creek (downstream of UTPC)	PC-6	531
Unnamed Tributary of Pigeon Creek (UTPC)	UTPC-1	52
Unnamed Tributary of Pigeon Creek (UTPC)	UTPC-2	52
Pigeon Creek (upstream of UTPC)	PC-7	536
Pigeon Creek (downstream of PRC)	PC-8	612
Pigeonroost Creek (PRC)	PRC-1	48
Pigeonroost Creek (PRC)	PRC-2	46
Pigeon Creek (upstream of PRC)	PC-9	612
Miller Creek	MC-2	105
Miller Creek	MC-3	71
Miller Creek	MC-4	71
Miller Creek	MC-1	99
Miller Creek (downstream of project)	MC-5	90
Buffalo Creek (downstream of project)	BC-1	219

FIGURE 3.3 - CONDUCTIVITY MEASUREMENTS FOR THE PROPOSED BUFFALO MOUNTAIN PROJECT AREA



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- Observed Jurisdictional Channels**
- Ephemeral Stream
- Intermittent Stream
- Perennial Stream
- Remnant Mine Portals
- Conductivity Sampling Site (Spring of 2006)*
- Mined Portion of Watershed
- Unmined Portion of Watershed

*Conductivity in umhos in parenthesis ()

5.0 SECTION 5

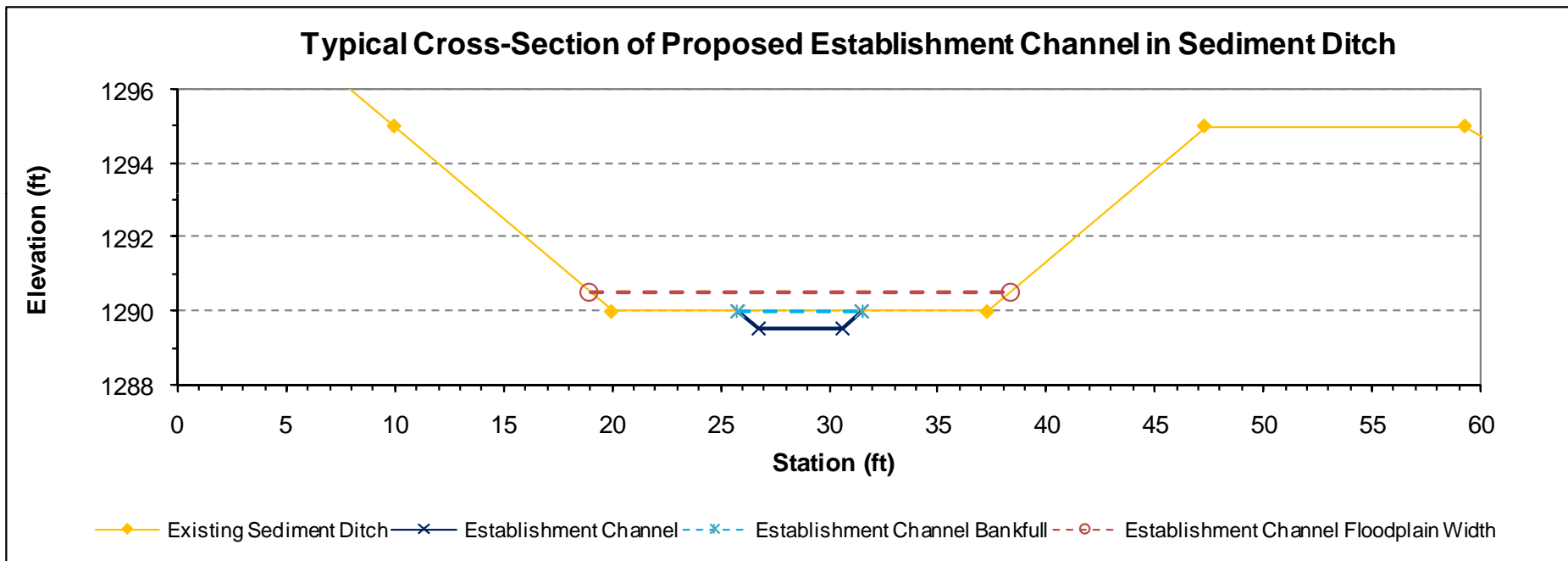




FIGURE 5.1 – Typical Cross-Section of Proposed Establishment Channel in Sediment Ditch



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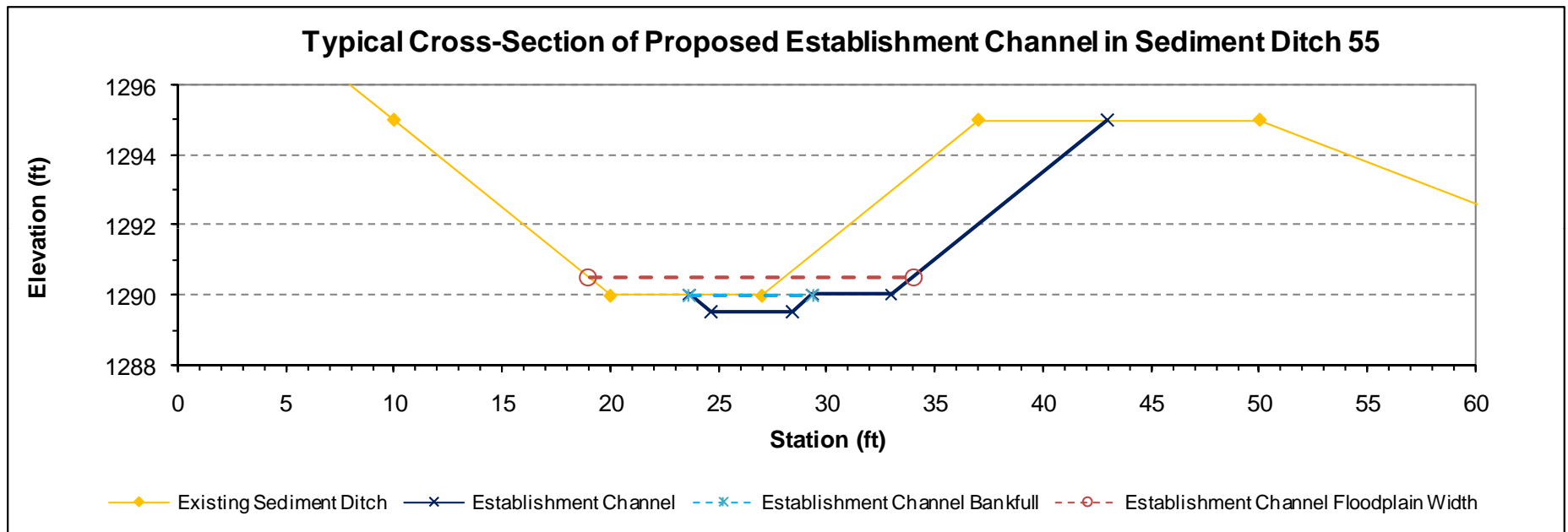


FIGURE 5.2 – Typical Cross-Section of Proposed Establishment Channel in Sediment Ditch 55 (requires additional excavation for floodplain)



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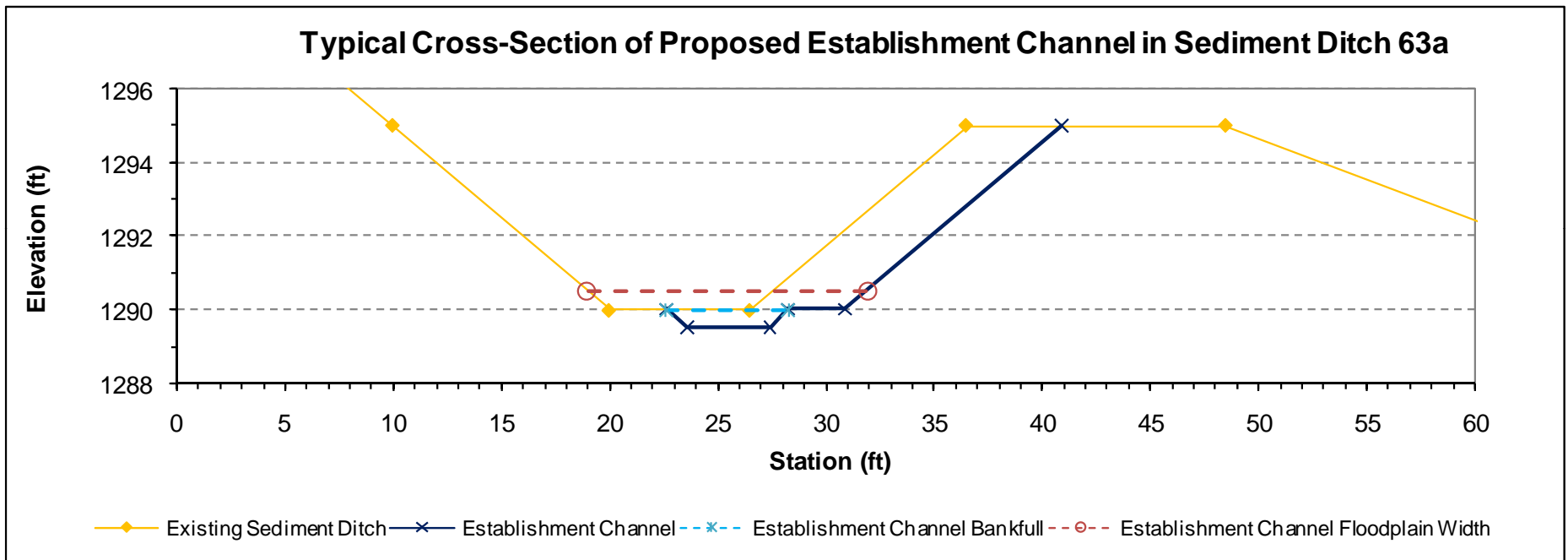


FIGURE 5.3 – Typical Cross-Section of Proposed Establishment Channel in Sediment Ditch 63a (requires additional excavation for floodplain)



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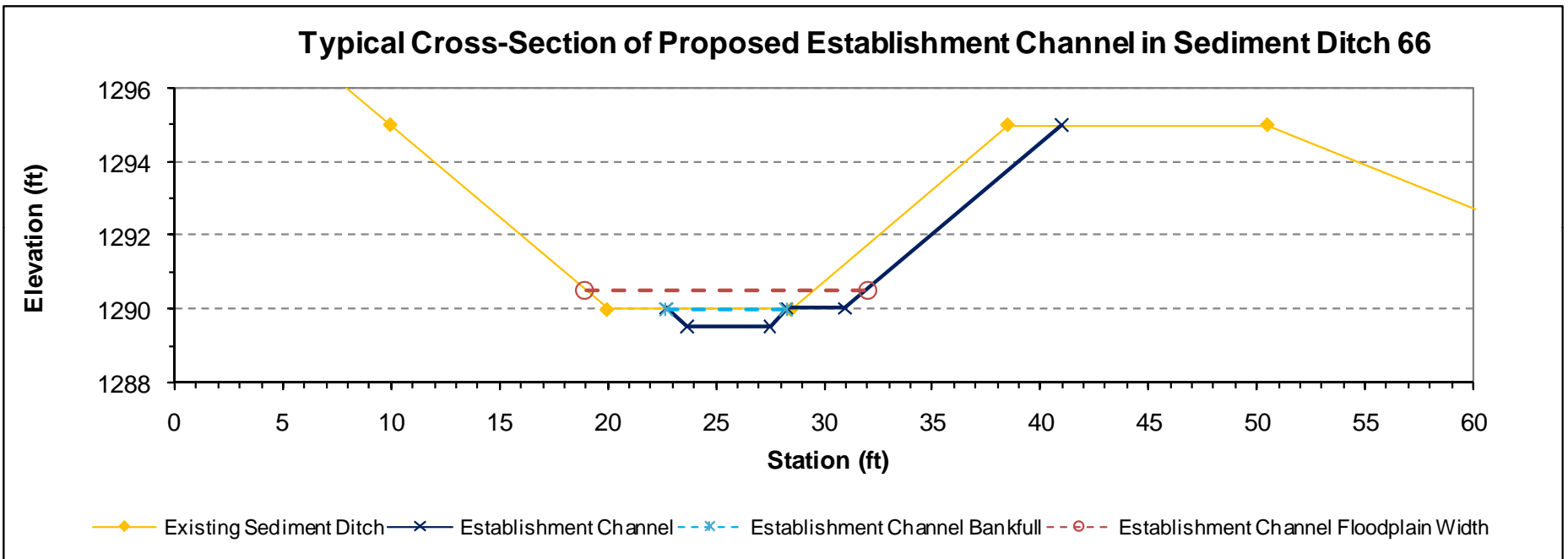




FIGURE 5.4 – Typical Cross-Section of Proposed Establishment Channel in Sediment Ditch 66 (requires additional excavation for floodplain)



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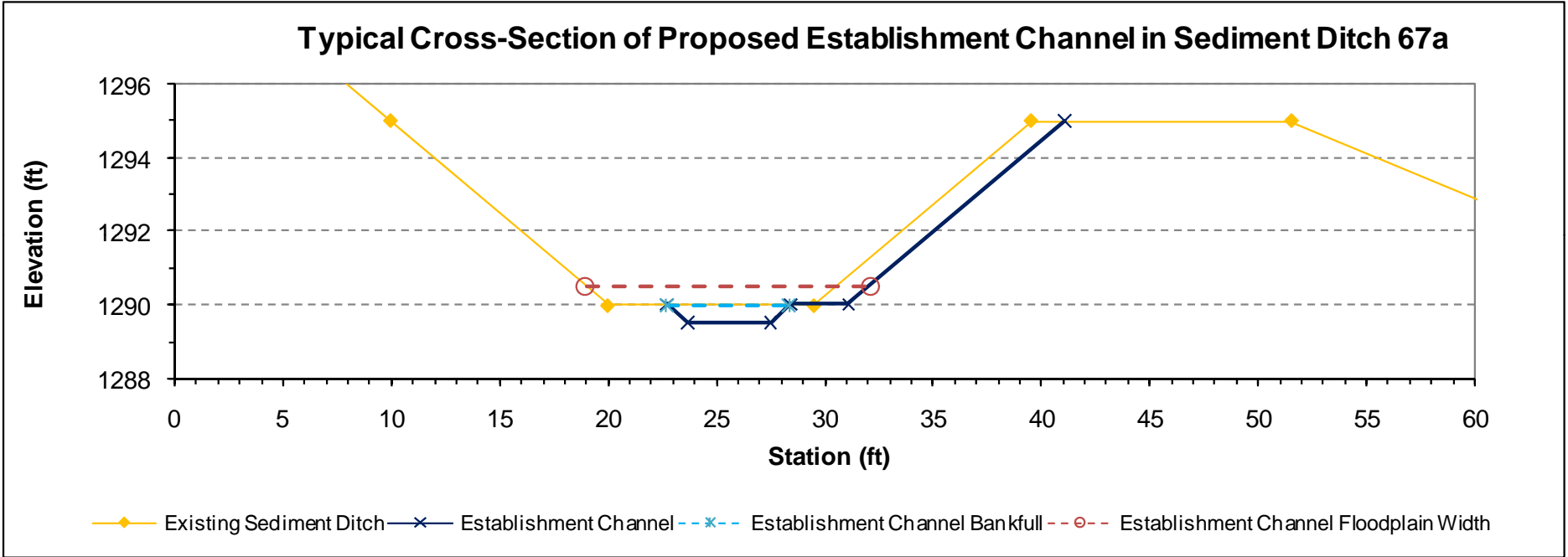


FIGURE 5.5 – Typical Cross-Section of Proposed Establishment Channel in Sediment Ditch 67a (requires additional excavation for floodplain)



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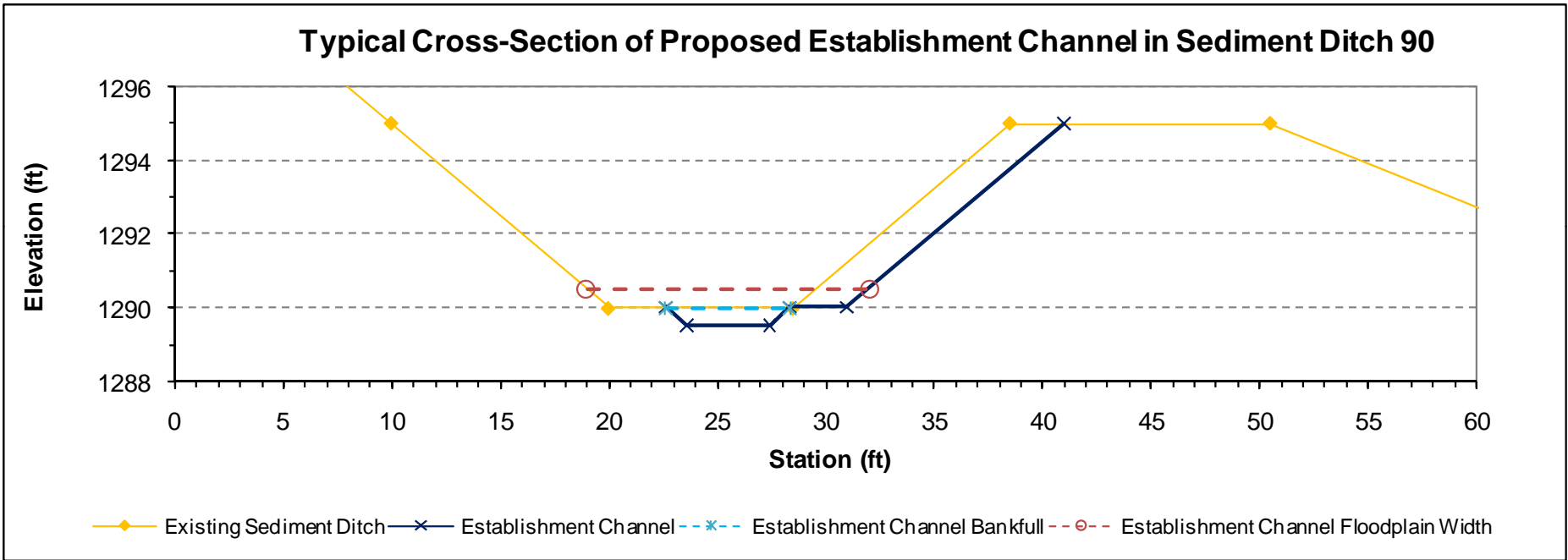




FIGURE 5.6 – Typical Cross-Section of Proposed Establishment Channel in Sediment Ditch 90 (requires additional excavation for floodplain)



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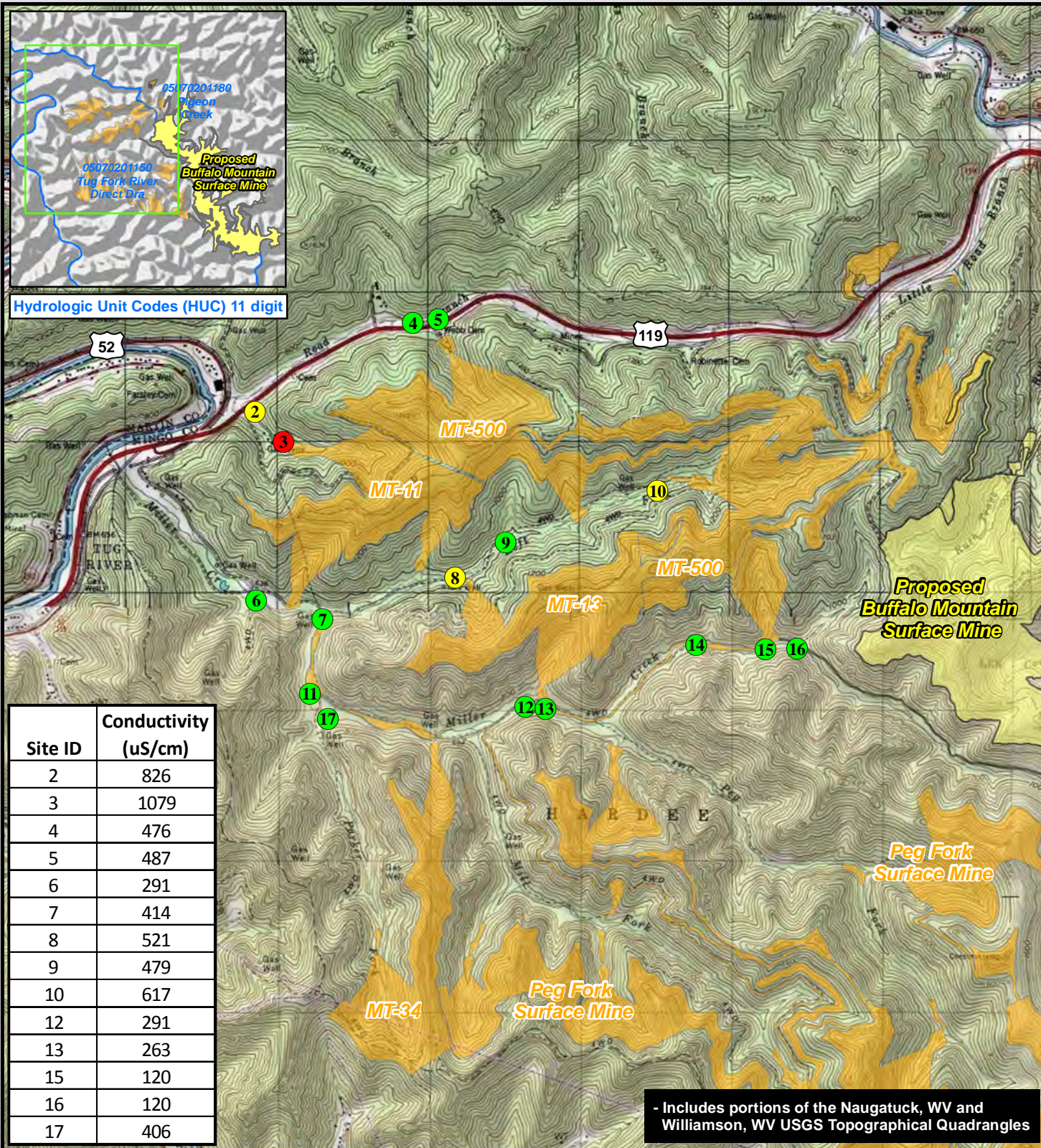


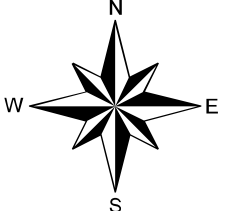
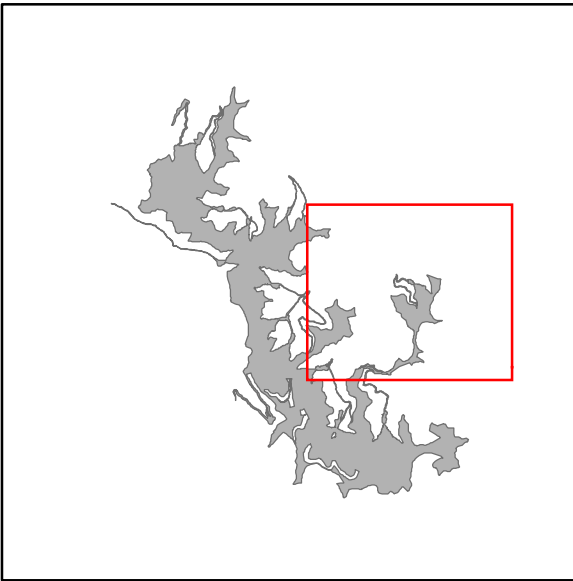
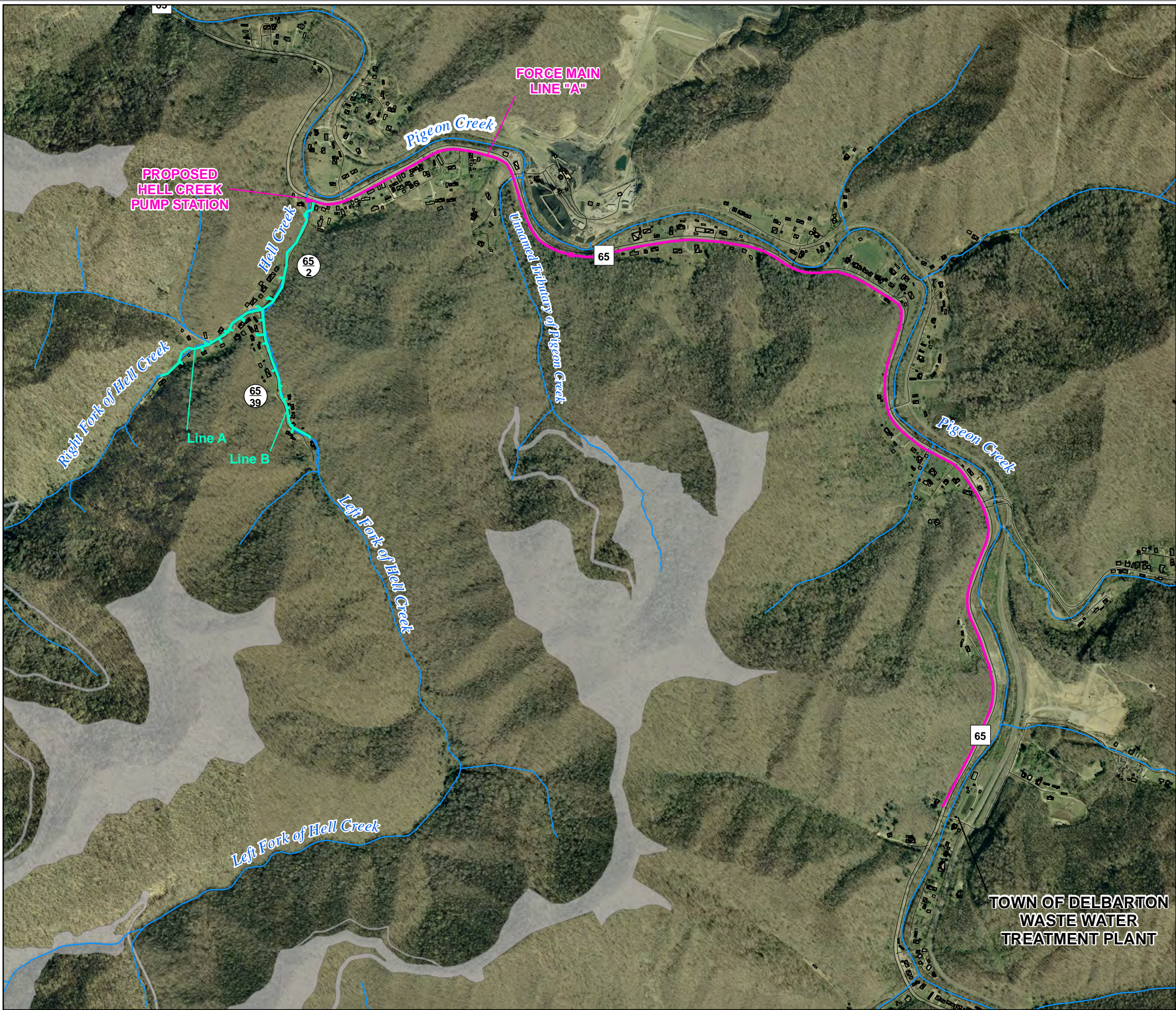
FIGURE 5.7: CONDUCTIVITY SAMPLES IN ADJACENT WATERSHED



- Sampling Station - Low Conductivity (<500 umhos)
- Sampling Station - Medium Conductivity (500-1000 umhos)
- Sampling Station - High Conductivity (>1000 umhos)
- Approved Surface Mine Permit
- Proposed Surface Mine Permit



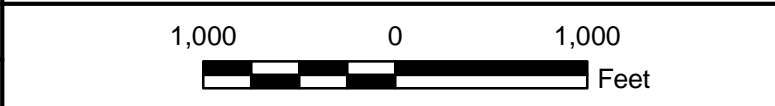
8.0 SECTION 8

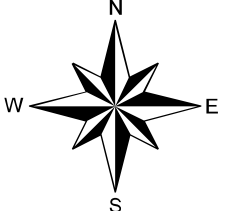
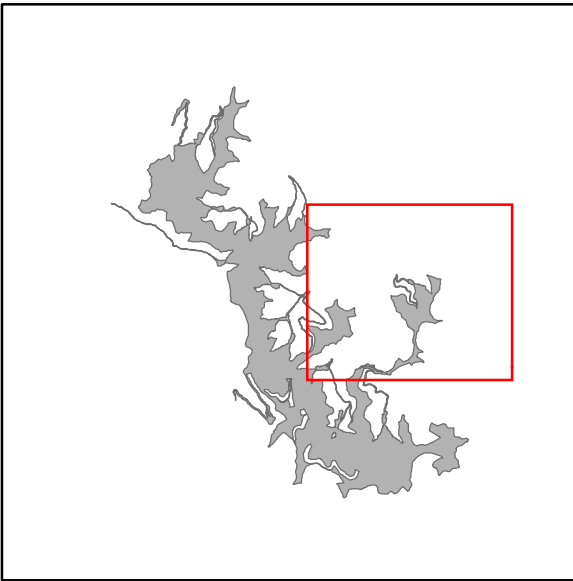
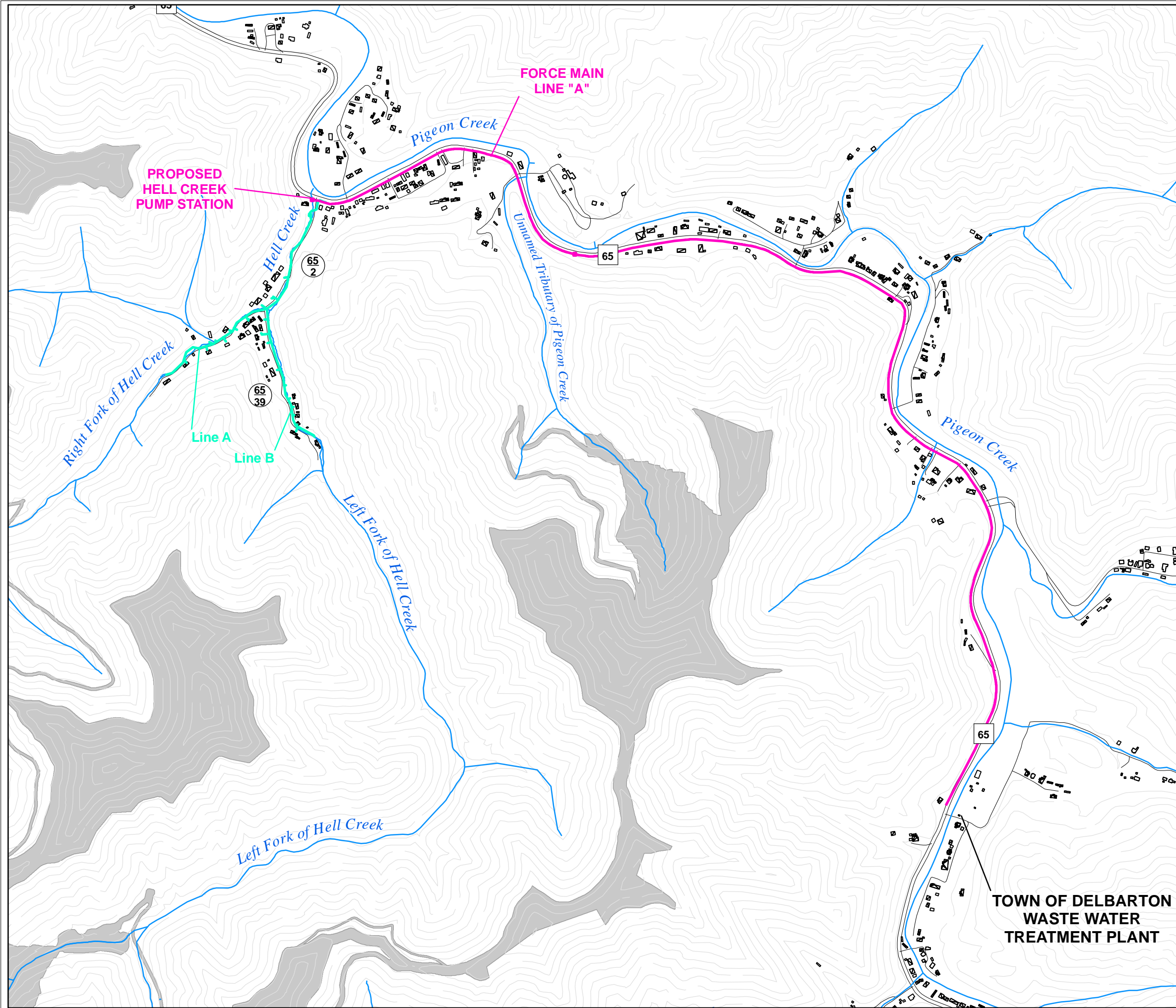


Legend

- Proposed Wastewater Force Main
- Proposed Wastewater Collection Line
- Mineral Removal/Disturbed Area

Figure 8.1- Aerial Map of Proposed Wastewater Gravity Line and Pump Station

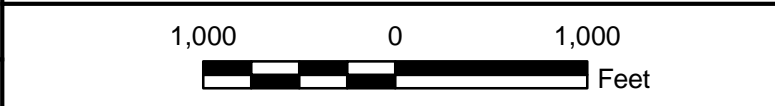




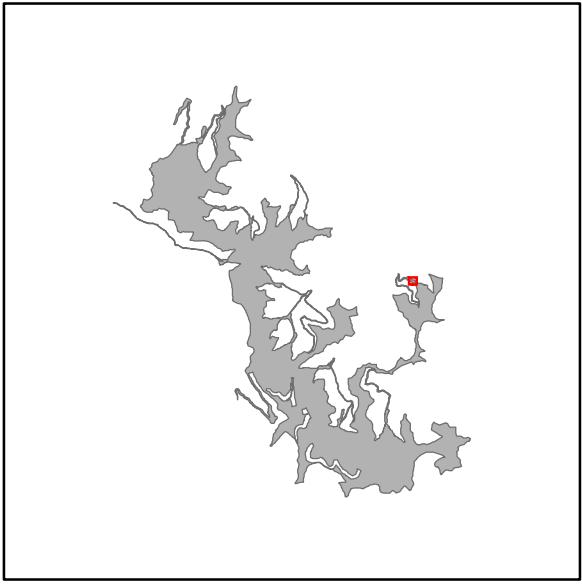
Legend

- Proposed Wastewater Force Main
- Proposed Wastewater Collection Line
- Mineral Removal/Disturbed Area

Figure 8.2- Topographical Map of Proposed Wastewater Gravity Line and Pump Station



12.0 SECTION 12



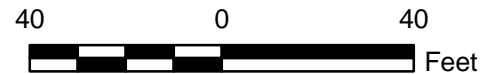
Legend

- Mineral Removal/Disturbed Area
- On-Site Restoration Reach*
- Crest Gauge
- Photo Station
- Macroinvertebrate Collection Site
- Pool Cross-section
- Riffle Cross-section
- Vegetation Monitoring Plot

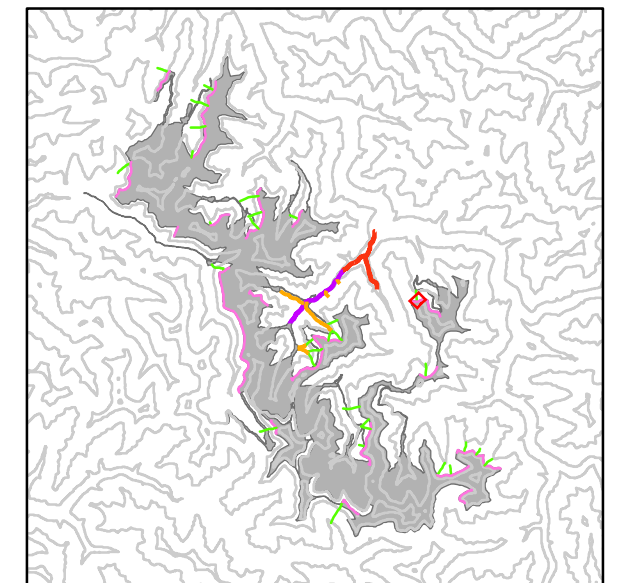
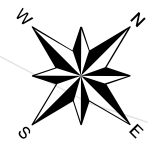
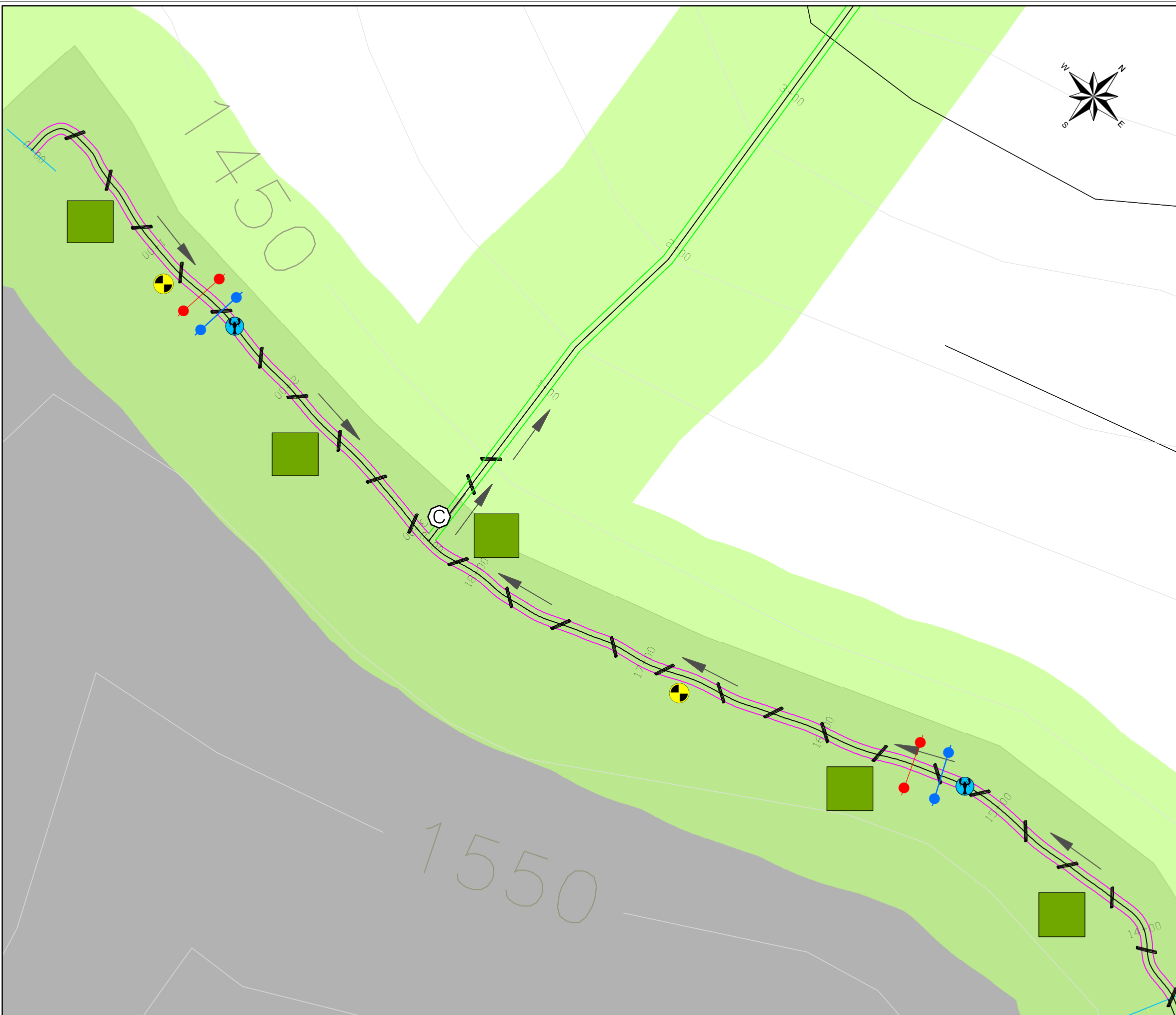
- Longitudinal Profiles will be surveyed each reach extending 20-30 times bankfull width
- Habitat Assessment Values will be determined along approximately 100 meters (328 feet) of each On-Site Establishment channel
- Bank Erosion Hazard Index scores will be collected throughout each reach
- Pebble Counts will be conducted at each pair of permanent cross-sections
- Fish populations will be surveyed approximately 40 times bankfull width of each On-Site Restoration channel

*Each reach includes Riparian Buffers proposed to be 75 ft from each stream bank

Figure 12.1- Conceptual On-Site Restoration Monitoring Map



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Legend

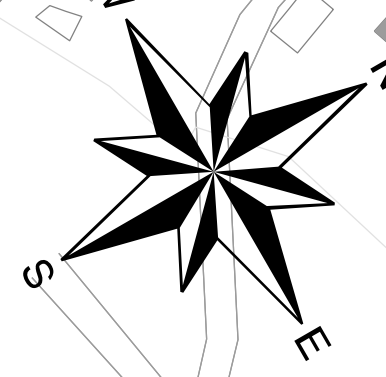
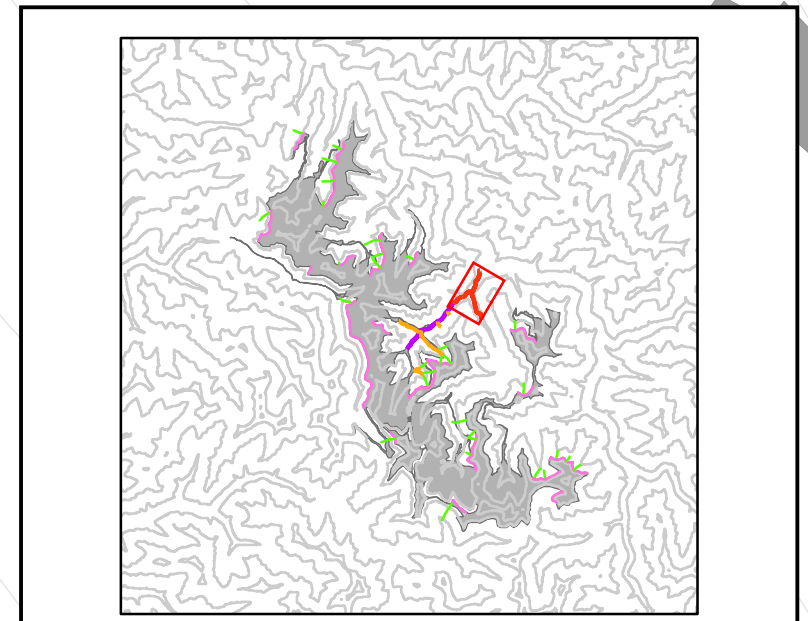
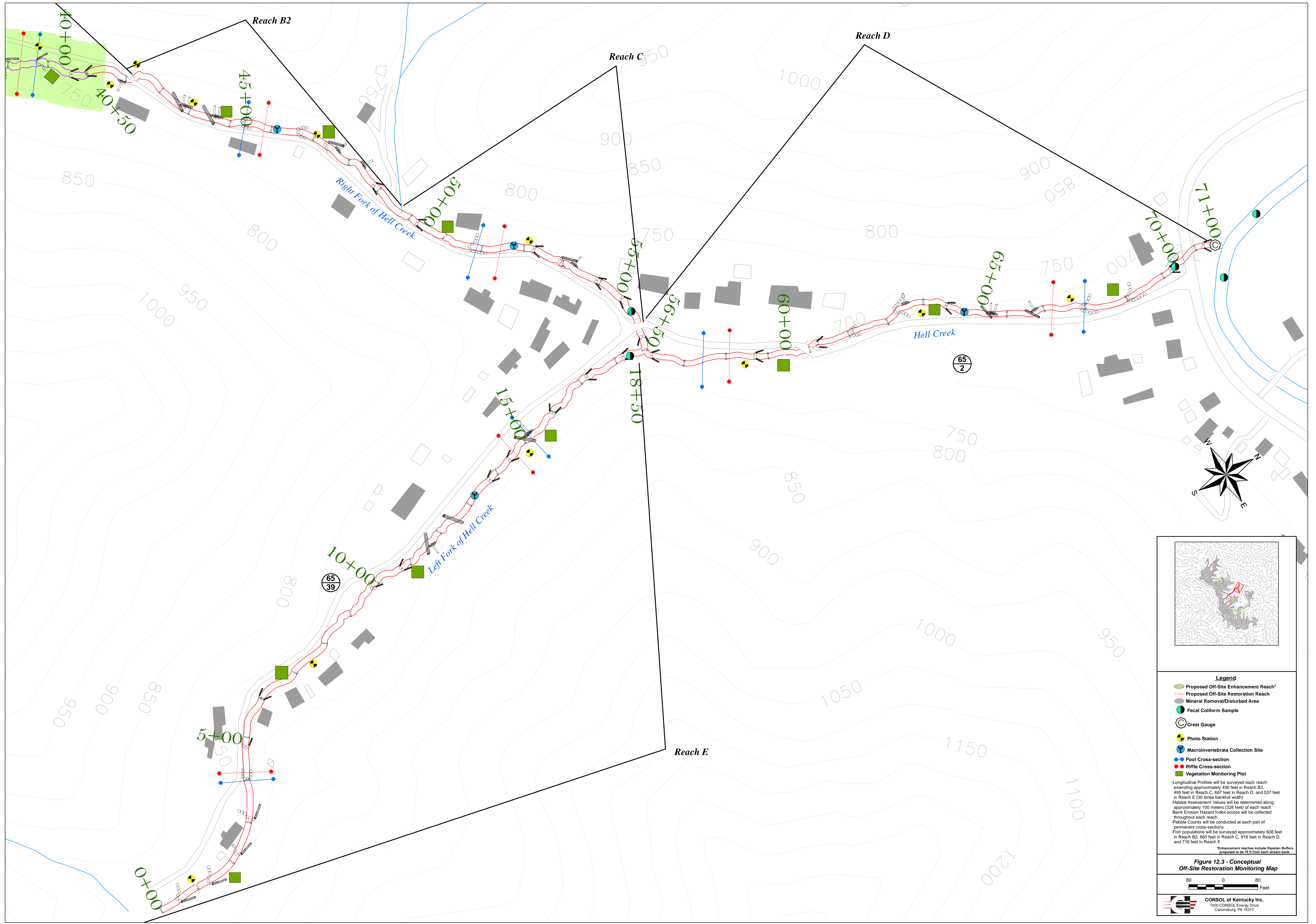
- Mineral Removal/Disturbed Area
- Off-site Establishment Reach*
- On-Site Establishment Reach*
- Crest Gauge
- Photo Station
- Macroinvertebrate Collection Site
- Pool Cross-section
- Riffle Cross-section
- Vegetation Monitoring Plot

- Longitudinal Profiles will be surveyed each reach extending 20-30 times bankfull width
- Habitat Assessment Values will be determined along approximately 100 meters (328 feet) of each On-Site Establishment channel
- Bank Erosion Hazard Index scores will be collected throughout each reach
- Pebble Counts will be conducted at each pair of permanent cross-sections

*Each reach includes Riparian Buffers proposed to be 75 ft from each stream bank

Figure 12.2 - Conceptual On- & Off-Site Establishment Monitoring Map





Legend

- Proposed Off-Site Enhancement Reach*
- Proposed Off-Site Restoration Reach
- Mineral Removal/Disturbed Area
- Fecal Coliform Sample
- C Crest Gauge
- ⬢ Photo Station
- Macroinvertebrate Collection Site
- Pool Cross-section
- Riffle Cross-section
- Vegetation Monitoring Plot

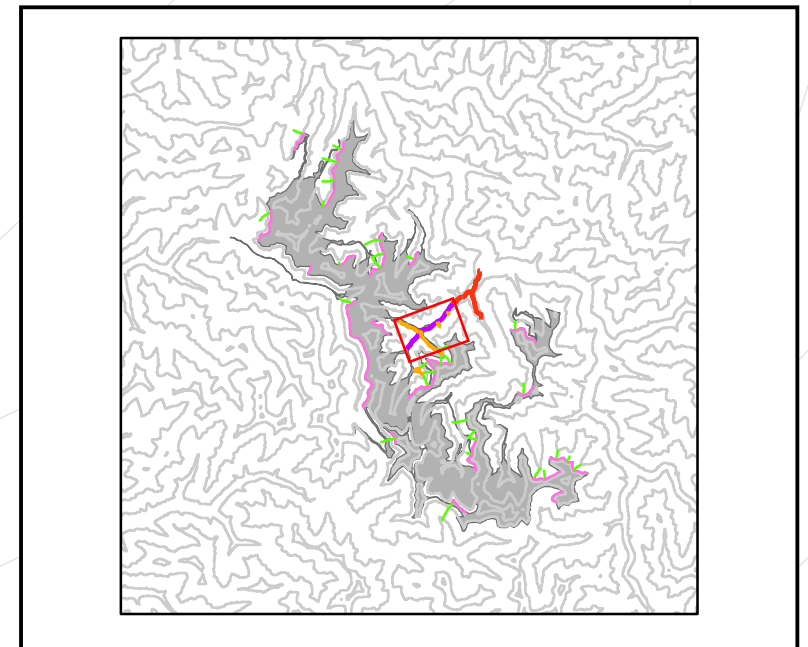
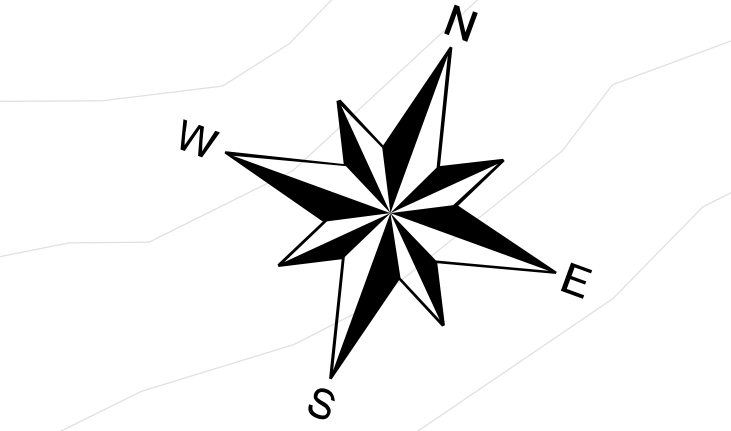
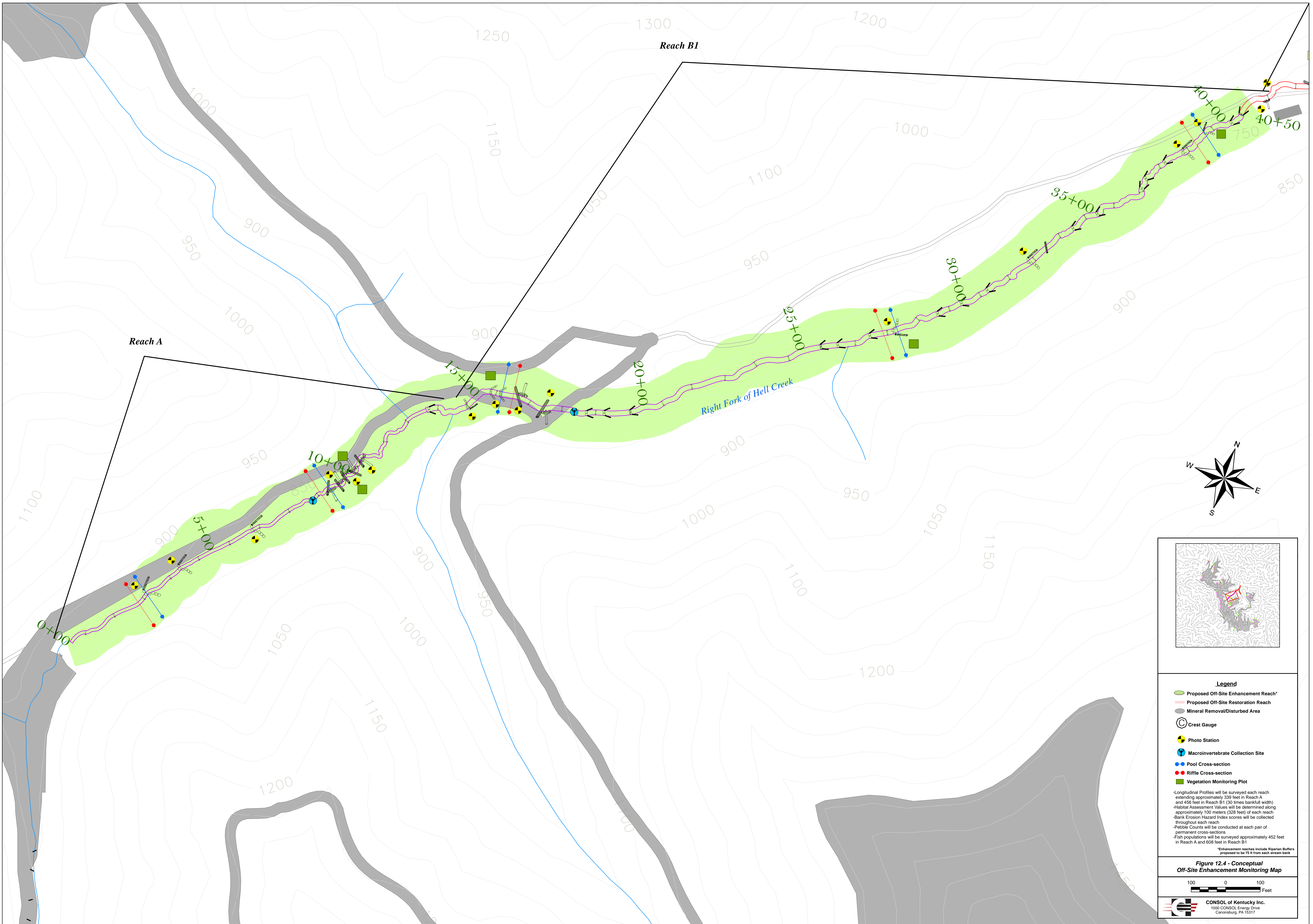
*Longitudinal Profiles will be surveyed each reach extending approximately 456 feet in Reach B2, 456 feet in Reach C, 607 feet in Reach D, and 537 feet in Reach E (30 times bankfull width).
 -Habitat Assessment Values will be determined along approximately 100 meters (328 feet) of each reach
 -Bank Erosion Hazard Index scores will be collected throughout each reach
 -Rubble Counts will be conducted at each pair of permanent cross-sections
 -Fish populations will be surveyed approximately 608 feet in Reach B2, 660 feet in Reach C, 916 feet in Reach D, and 716 feet in Reach E

*Enhancement reaches include Riparian Buffers proposed to be 75 ft from each stream bank

Figure 12.3 - Conceptual Off-Site Restoration Monitoring Map

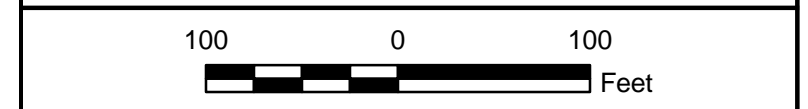
0 80 80 Feet

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- Legend**
- Proposed Off-Site Enhancement Reach*
 - Proposed Off-Site Restoration Reach
 - Mineral Removal/Disturbed Area
 - Crest Gauge
 - Photo Station
 - Macroinvertebrate Collection Site
 - Pool Cross-section
 - Riffle Cross-section
 - Vegetation Monitoring Plot
- *Longitudinal Profiles will be surveyed each reach extending approximately 339 feet in Reach A and 456 feet in Reach B1 (30 times bankfull width)
 †Habitat Assessment Values will be determined along approximately 100 meters (328 feet) of each reach throughout each reach
 ‡Bank Erosion Hazard Index scores will be collected at each pair of permanent cross-sections
 ‡Fish populations will be surveyed approximately 452 feet in Reach A and 608 feet in Reach B1
 *Enhancement reaches include Riparian Buffers proposed to be 75 ft from each stream bank

Figure 12.4 - Conceptual Off-Site Enhancement Monitoring Map



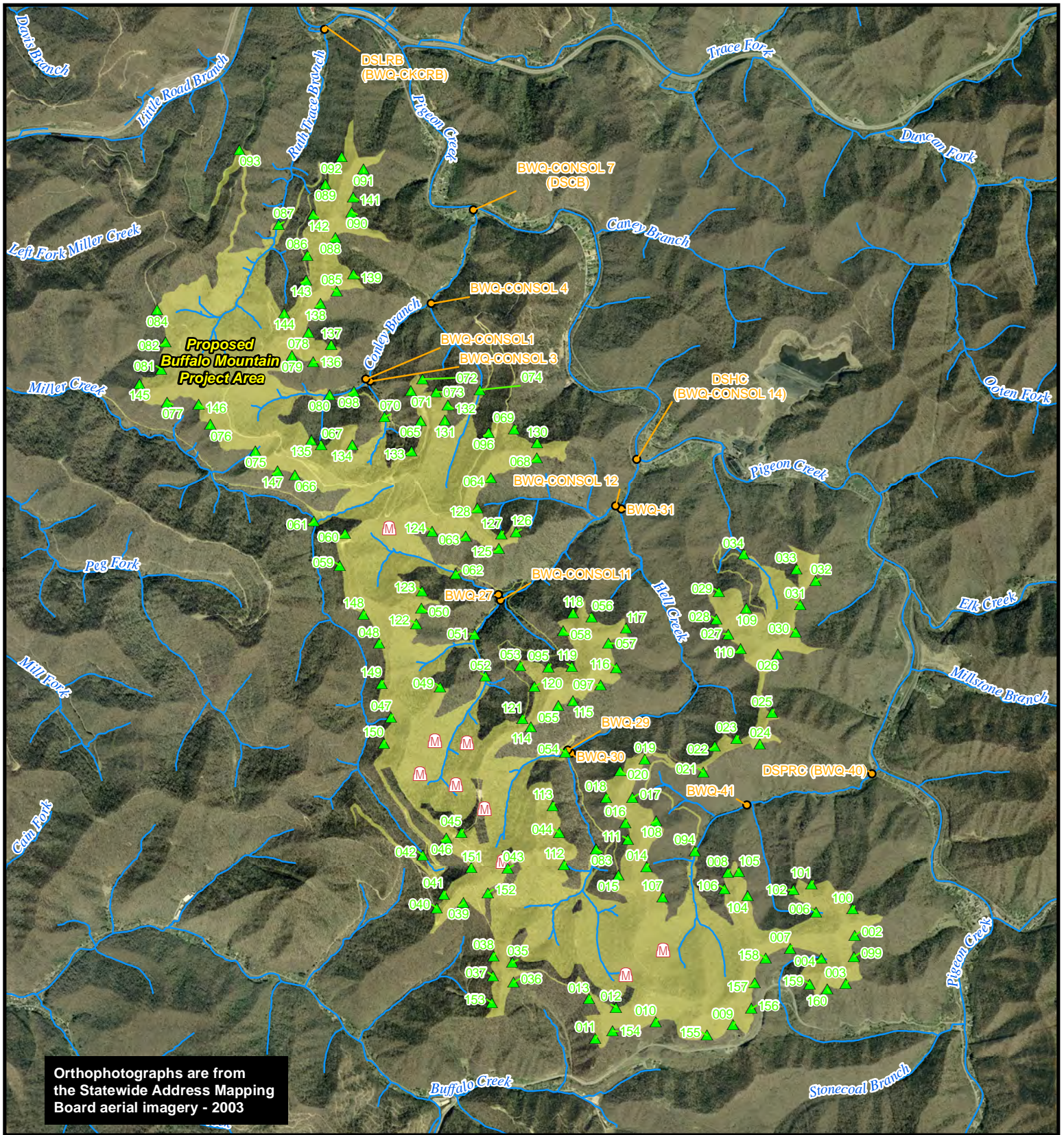
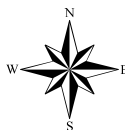


FIGURE 12.5 - AERIAL MAP OF WATER QUALITY MONITORING SITES



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1,000 500 0 1,000
 Meters

- Basic Water Quality (BWQ) Site
- ▲ NPDES Outlet
- Ⓜ Remnant Mine Portals

3,500 0 3,500
 Feet

13.0 SECTION 13

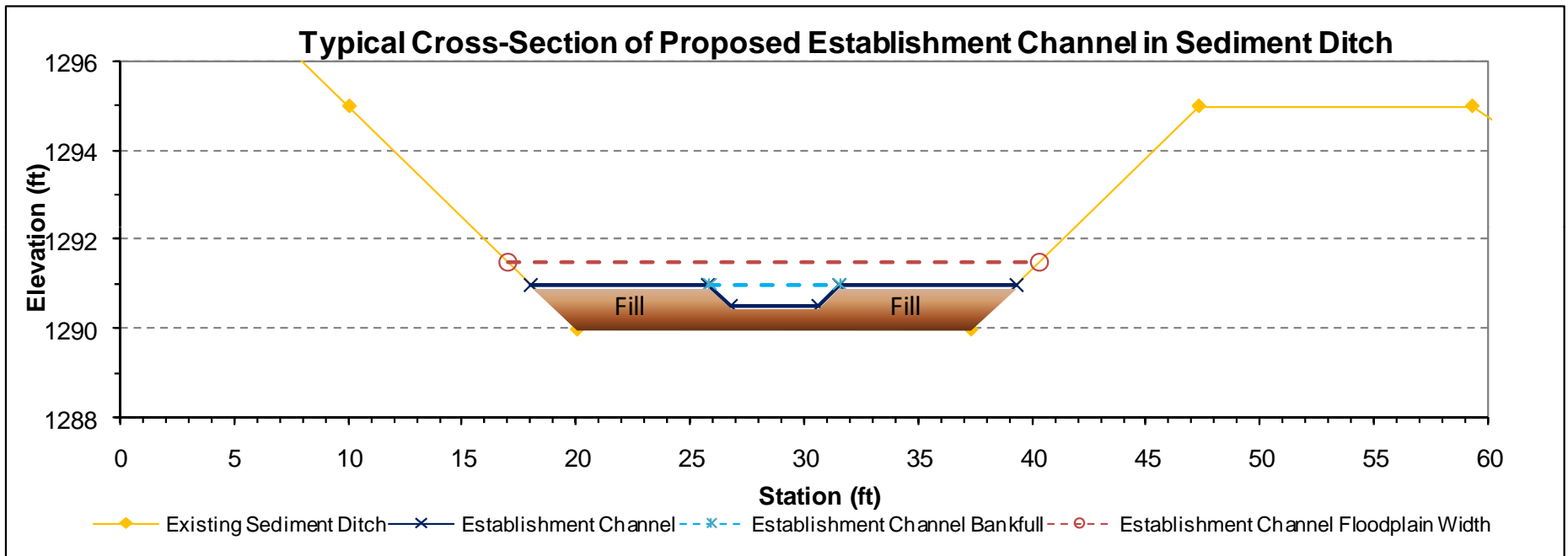


FIGURE 13.1 – Typical Cross-Section of Proposed Establishment Channel in Sediment Ditch (requires additional fill material for substrate and slope)



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