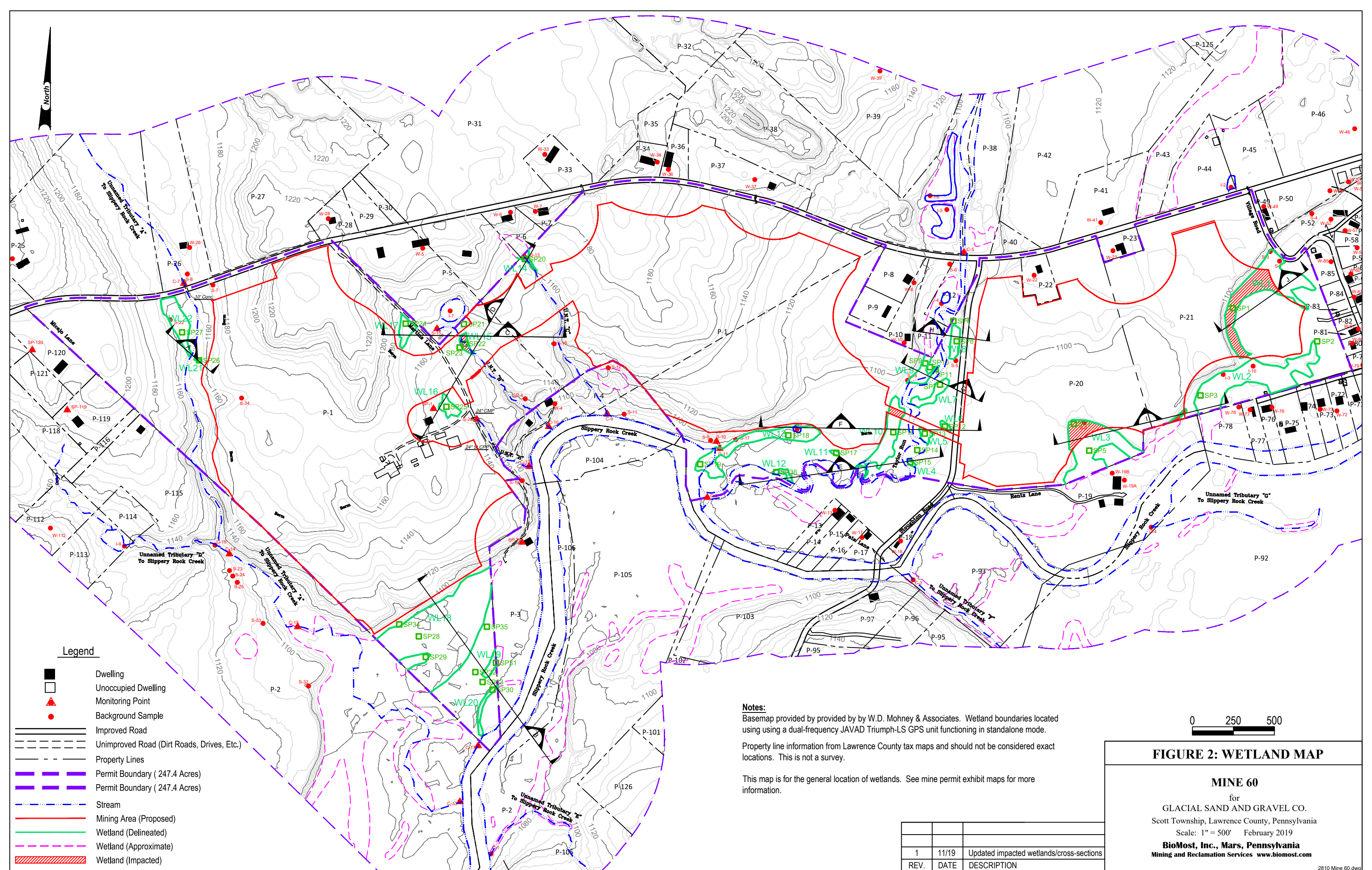


FIGURE 1: LOCATION MAP
 USGS 7.5' Harlansburg, PA (PR1990)

MINE 60
 for
 GLACIAL SAND AND GRAVEL CO.
 Scott Township, Lawrence County, Pennsylvania
 Scale: 1" = 2000' February 2019
BioMost, Inc., Mars, Pennsylvania
 Mining and Reclamation Services www.biomost.com



Legend

- Dwelling
- Unoccupied Dwelling
- Monitoring Point
- Background Sample
- Improved Road
- Unimproved Road (Dirt Roads, Drives, Etc.)
- Property Lines
- Permit Boundary (247.4 Acres)
- Permit Boundary (247.4 Acres)
- Stream
- Mining Area (Proposed)
- Wetland (Delineated)
- Wetland (Approximate)
- Wetland (Impacted)

Notes:
 Basemap provided by provided by W.D. Mohny & Associates. Wetland boundaries located using using a dual-frequency JAVAD Triumph-LS GPS unit functioning in standalone mode.

Property line information from Lawrence County tax maps and should not be considered exact locations. This is not a survey.

This map is for the general location of wetlands. See mine permit exhibit maps for more information.

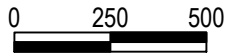
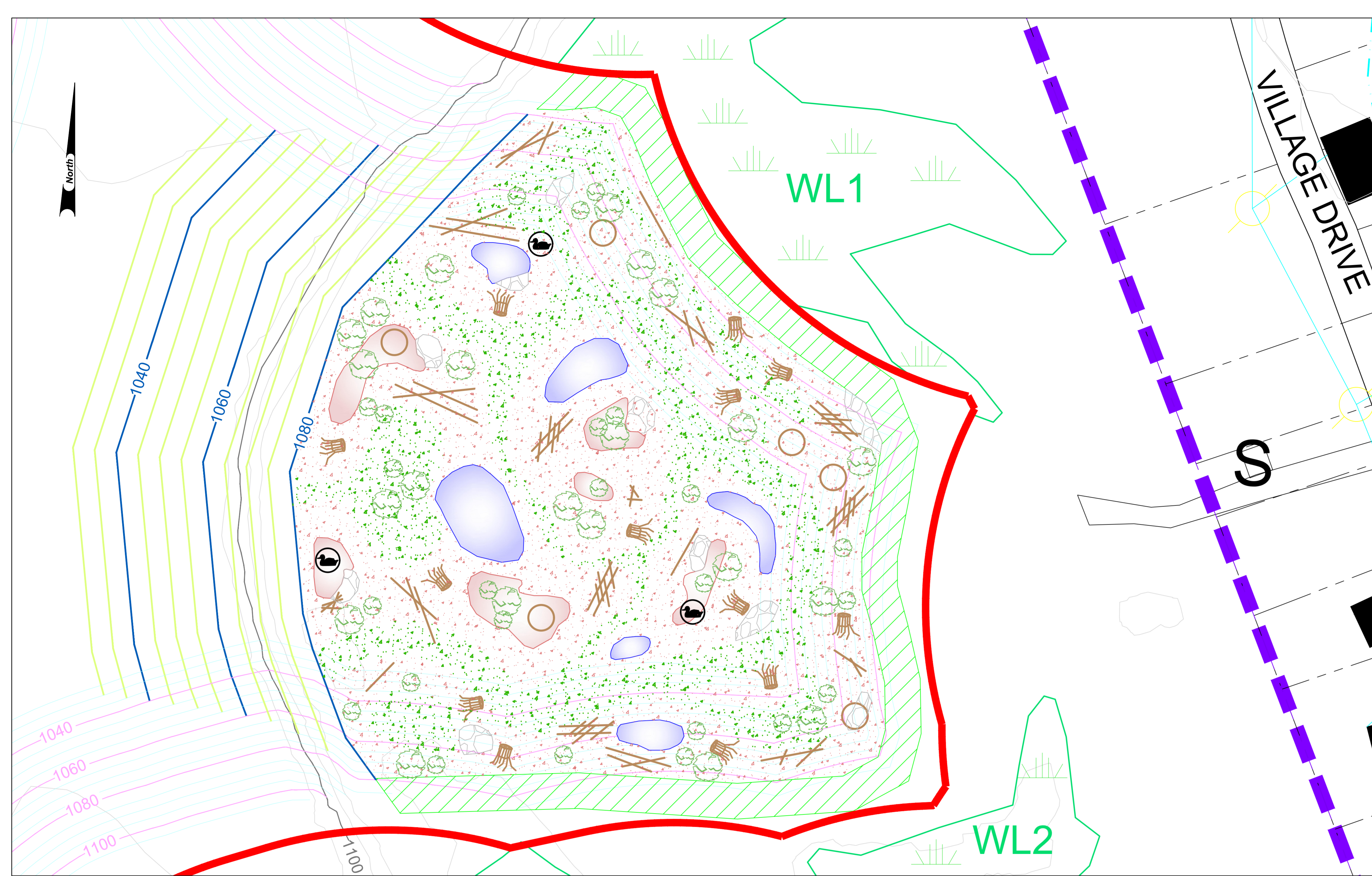


FIGURE 2: WETLAND MAP

MINE 60
 for
 GLACIAL SAND AND GRAVEL CO.
 Scott Township, Lawrence County, Pennsylvania
 Scale: 1" = 500' February 2019
BioMost, Inc., Mars, Pennsylvania
 Mining and Reclamation Services www.biomost.com

REV.	DATE	DESCRIPTION
1	11/19	Updated impacted wetlands/cross-sections



SUGGESTED TREES FOR MITIGATION WETLAND & BUFFER				
Scientific Name	Common Name	Indicator Status	Spacing (ft OC)	Wildlife Value
<i>Acer rubrum</i>	Red Maple	FAC	> 7	Food: cardinals, grosbeaks, bobwhite, yellow-bellied sapsucker, waterbirds, squirrels, chipmunks and hooved browsers. Cover and nesting: robins, goldfinches and prairie warbler
<i>Acer saccharinum</i>	Silver Maple	FACW	> 7	Food: cardinals, grosbeaks, bobwhite, oriole, goldfinch, and deer. Cover and nesting: orioles, goldfinches
<i>Betula nigra</i>	River Birch	FACW	> 7	Food: grouse, redpoll, pine siskin, turkey, deer, beaver, rabbit, porcupine
<i>Fraxinus pennsylvanica</i>	Green Ash	FACW	> 7	Food: wood duck, bobwhite, red-winged blackbird, quail, turkey, cardinal, purple finch, grosbeaks, yellow-bellied sapsucker, waxwing, beaver, mice, squirrels, and deer.
<i>Picea glauca</i>	White Spruce	FACU	> 7	Food: squirrels, chipmunks, mice, shrews, voles, porcupines, song birds, black bears, woodpeckers, rabbits. Cover: small mammals, deer, ruffed grouse, songbirds
<i>Pinus strobus</i>	Eastern White Pine	FACU	> 7	Food: squirrels, chipmunks, mice, porcupine, song birds, black bear, woodpeckers, rabbits. Cover: small mammals, deer, ruffed grouse, songbirds
<i>Platanus occidentalis</i>	Sycamore	FACW-	> 7	Food: songbirds, terrestrial furbearers, aquatic furbearers. Cover/Dens: wood duck, opossum, raccoon
<i>Quercus palustris</i>	Pin Oak	FACW	> 7	Food: wood duck, mallard, turkey, grouse, bobwhite, blue jay, brown thrasher, towhee, woodpeckers, deer, fox, opossum, raccoon. Cover: scarlet tanager, grosbeaks
<i>Salix nigra</i>	Black Willow	OBL	> 7	Food: wood duck, mallard, northern shoveler, green-winged teal, turkey, grouse, bobwhite, blue jay, grosbeaks, brown thrasher, towhee, woodpeckers, elk, deer, fox, beaver, rabbits, squirrel, porcupine, muskrat, honey bees, butterflies. Cover: American crow, northern oriole, scarlet tanager, rose-breasted grosbeak
<i>Taxa canadensis</i>	Eastern Hemlock	FACU	> 7	Food: ruffed grouse, turkey, great horned owl, song birds, squirrels. Cover: small mammals, deer, ruffed grouse, turkey, songbirds
<i>Ulmus rubra</i>	Slippery Elm	FAC	> 7	Food: wood duck, wild turkey, ruffed grouse, rose-breasted grosbeak, goldfinch, purple finch, yellow-bellied sapsucker, rabbits, squirrels, chipmunk, deer, beaver, moths, and butterflies. Cover and nesting: red shouldered hawk, orioles, warbling vireo

Note: All trees should be planted in Hummock/Island Habitat and on the outer edge of the wetland except for *Salix nigra*, which can also be planted within the Marsh Zone. Spacing for the above tree species are based on container-grown plants with a minimum height of 24 inches. Bare root trees or container seedlings (also with a minimum height of 24 inches) may be substituted at half the spacing distance.

SUGGESTED SHRUBS FOR MITIGATION WETLAND & BUFFER						
Scientific Name	Common Name	Indicator Status	Inundation Depth	Zone	Spacing (ft OC)	Wildlife Value
<i>Alnus rugosa</i>	Speckled Alder	FACW+	S	H/HM	> 5	Food: ducks, turkey, pheasant, grosbeaks, finches, grouse, bobwhite, dove, sparrows, small mammals, hooved browsers. Cover: woodcock, flycatchers, blackbirds, grosbeaks, sparrows, beavers
<i>Aronia melanocarpa</i>	Black Chokeberry	FAC	S	H	> 5	Food: chickadee, bobwhite, grouse, catbird, brown thrasher, cedar waxwing, meadowlark, large and small mammals, hooved browsers
<i>Cephalanthus occidentalis</i>	Buttonbush	OBL	up to 3'	H/M/LM/P	> 5	Food: ducks, deer, hummingbirds. Cover and Nesting: Virginia rail, red-winged blackbird
<i>Cornus amomum</i>	Silky Dogwood	FACW	S	H/HM	> 5	Food: catbird, turkey, grouse, bobwhite, pheasant, flicker, woodpeckers, eastern kingbird, brown thrasher, robin, thrasher, bluebirds, cedar waxwings, purple finches, deer, beaver, rabbit, woodchucks, raccoons, squirrels, woodcocks and song sparrows. Cover and Nesting: gray catbird and goldfinch.
<i>Cornus sericea</i>	Red-osier Dogwood	FACW+	S	H/HM	> 5	Food: turkey, grouse, bobwhite, pheasant, eastern kingbird, brown thrasher, deer, beaver, rabbit, woodchucks, raccoons. Cover and Nesting: goldfinch.
<i>Physocarpus opulifolius</i>	Ninebark	FACW-	S	H	> 5	Food: hooved browsers, large mammals
<i>Salix discolor</i>	Pussy Willow	FACW	S	H	> 5	Food: grouse, grosbeak, beaver, deer, squirrel, rabbit, muskrat, other small game, ducks, turkey, bobwhite, pheasant, dove, woodpeckers, flicker, sapsucker, blue jay, tufted titmouse, nuthatch, wrens, brown thrasher, thrush, starlings, meadowlark, blackbirds, grackle, cardinal, towhees. Cover: crow, oriole, scarlet tanager, grosbeaks
<i>Salix sericea</i>	Silky Willow	OBL	S	H/H	> 5	Food: grouse, grosbeak, beaver, deer, squirrel, rabbit, muskrat, other small game, ducks, turkey, bobwhite, pheasant, dove, woodpeckers, flicker, sapsucker, blue jay, tufted titmouse, nuthatch, wrens, brown thrasher, thrush, starlings, meadowlark, blackbirds, grackle, cardinal, towhees. Cover: crow, oriole, scarlet tanager, grosbeaks
<i>Spiraea tomentosa</i>	Sleepybush	FACW	S	H/HM	> 5	Food: moths and butterflies. Cover: songbirds, waterfowl, small mammals
<i>Viburnum lentago</i>	Nannyberry	FAC	S	H	> 5	Food: flicker, robin, bluebird, cedar waxwing, grosbeaks, finch, catbird, woodpecker, grouse, turkey, pheasant, bobwhite, thrush, rabbit, chipmunk, squirrel, deer, beaver. Cover: grouse, bobwhite, pheasant, thrush, catbird

Note: Spacing for the above shrub species are based on container-grown plants with a minimum height of 18 inches. Bare root shrubs (also with a minimum height of 18 inches) may be substituted at half the spacing distance. Abbreviations: S-Saturated, H-Hummock/Island Habitat, HM-High Marsh, LM-Low Marsh, P-Deep Pool

SUGGESTED WETLAND SEED MIX		
Scientific Name	Common Name	% by Mass
<i>Carex vulpinoidea</i>	Fox Sedge	30
<i>Panicum clandestinum</i>	Deertongue	20
<i>Poa palustris</i>	Fowl Bluegrass	15
<i>Cornus amomum</i>	Silky Dogwood	5
<i>Viburnum Dentatum</i>	Arrowwood	5
<i>Verbena hastata</i>	Blue Vervain	5
<i>Bidens aristosa</i>	Showy Tickseed Sunflower	5
<i>Echinochloa muricata</i>	Barnyard Grass	5
<i>Cephalanthus occidentalis</i>	Buttonbush	5
<i>Polygonum sagittatum</i>	Arrowleaf Tearthumb	3
<i>Eleocharis palustris</i>	Creeping Spikerush	2

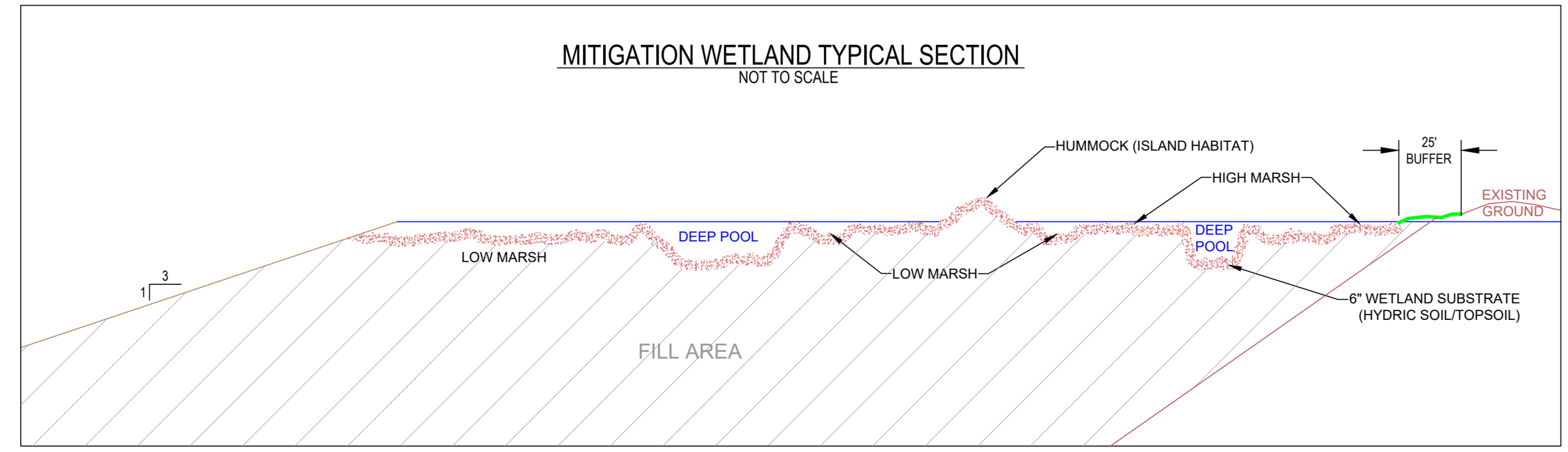
SUGGESTED BUFFER SEED MIX		
Scientific Name	Common Name	% by Mass
<i>Panicum virgatum</i>	Shelter Switch Grass	20
<i>Schizachyrium scoparium</i>	Little Bluestem, PA Ecotype	20
<i>Sorghastrum nutans</i>	Indiangrass, PA Ecotype	17
<i>Elymus virginicus</i>	Virginia Wild Rye	15
<i>Andropogon gerardii</i>	Niagara Big Bluestem	10
<i>Chamaecrista fasciculata</i>	Partridge Pea	6
<i>Panicum amarum</i>	Atlantic Coastal Panic Grass	5
<i>Poa palustris</i>	Fowl Bluegrass	3
<i>Rudbeckia hirta</i>	Black Eyed Susan	3
<i>Coreopsis tinctoria</i>	Plains Coreopsis	1

PROPOSED HYDROLOGIC ZONES

Hydrologic Zone	Abbreviation	Depth Range (ft)	Water Regime
Hummock/Island Habitat	H	0 to +3	Seasonally saturated
High Marsh	HM	-0.5 to 0	Temporary inundation/seasonal saturation to ground surface
Low Marsh	HM	-1.5 to -0.5	Semipermanently flooded
Deep Pool	P	-4 to 0	Permanent/seasonal inundation

PROPOSED WETLAND CLASSIFICATION

Total	Size (ac)		
	PEM	PSS	PFO
2.98	1.98	0.60	0.40



- LEGEND**
- BUILDING
 - CONTOUR - INDEX (EXISTING)
 - CONTOUR - INTERMEDIATE (EXISTING)
 - CONTOUR - INDEX (PIT)
 - CONTOUR - INTERMEDIATE (PIT)
 - CONTOUR - INDEX (MITIGATION)
 - CONTOUR - INTERMEDIATE (MITIGATION)
 - PERMIT BOUNDARY
 - BONDED AREA
 - ROAD (IMPROVED)
 - PROPERTY LINE (APPROXIMATE)
 - DEEP POOL
 - WETLAND BUFFER
 - WETLAND (EXISTING)
 - FALLEN LOG/WOODY DEBRIS
 - ROOTWAD
 - ROCK CLUSTER
 - SNAG
 - WOOD DUCK BOX
 - SHRUB/TREE PLANTING AREA

Notes:

Basemap provided by provided by W.D. Mohney & Associates, Kittanning, PA. For additional site information, please refer to permit exhibits for more information.

Topographic contours derived from a bare-earth digital surface model constructed from LIDAR (Spring 2006) data developed as part of the PAMAP program.

Property line information from Lawrence County tax maps and should not be considered exact locations. This is not a survey.

Wetland to be constructed after reclamation allowing time for setting of the fill material.

Microrelief to be created within mitigation wetland. Elevations to vary no more than 3' and will average approximately 1.5'. Microrelief shown in typical section is a general representation.

Microrelief, islands, and hummocks to be constructed with loose organic soil material. Do not compact.

Wildlife structures, including snags, root wads, brush piles, woody debris, and rock piles, will be placed within and surrounding the mitigation wetland (locations shown are approximate). Structures to be salvaged during mining activities and will be placed throughout mitigation wetland following soil placement.

Rock clusters to contain durable stone greater than 2' in diameter and arranged to create crevices for shelter and nesting.

Substitutions to the suggested plants and seed mixes that provide equivalent value to wildlife are allowed.

WETLAND MITIGATION DESIGN PLAN

MINE 60
for
GLACIAL SAND AND GRAVEL CO.
situate in
Scott Township, Lawrence County, PA
Scale: Varies November 2019
BioMost, Inc., Mars, Pennsylvania
Mining and Reclamation Services www.biomost.com