Restoration Plan for Temporary Riparian Buffer Impacts

Snow Camp Mine

Alamance County
DWR# 20200320
April 15, 2020

This plan is submitted to the NCDWR/WSRO to provide additional detail regarding restoration of the temporary riparian buffer impacts associated with the construction of a service road for the Snow Camp Mine facility, Snow Camp, Alamance County NC.

A Location Map for the facility is included as Attachment 1.

Restoration Goal

The goal of the restoration plan is re-establishment the riparian buffer, approximating the current pre-construction conditions, as well as conditions specified in 15A NCAC 2B .0267(7)(a) and (b). This plan generally follows DWR Memorandum #2006-003 Temporary Road Vegetation Management.

Proposed Temporary Impacts

The proposed road will provide the main access to the facility, crossing Stream 3. The location of the proposed road crossing is included as Attachment 2. The detail of the road crossing, including permanent and temporary impacts, is included as Attachment 3 *Bridge Culvert Impact Figure*, dated 1/21/2020. Note: all construction work will be conducted under an approved Erosion and Sediment Control (ESC) plan.

Temporary impacts will occur on both the east and west side of the service road. The temporary impact total for the project is 4,883 square feet (sf). A summary of impacts for the project is as follows:

Impact (Service Road)	Zone 1	Zone 2	Total
Temporary Impact (sf)	*3,006*	*1,877*	*4,883*
Permanent Impact (sf)	2,929	1,671	4,600
Total Impact (sf)	5,935	3,548	9,483

Existing Conditions

Generally, the riparian buffer in the subject area is considered forested (>10% tree cover), with existing cover provided by mature hardwood forest vegetation of poplar (*Lirodendron tulipifera*), and water oaks (*Quercus nigra*), and a dominant herbaceous grass cover of approximately 80%

microstegium (*Microstegium vimineum*) and 20% common sedge (*Carex spp*). There is very little to no sapling/shrub cover present in the crossing area.

Although the mature forest canopy cover is approximately 100 percent, the total number of trees present is low.

Construction activities will avoid tree removal where possible. If removal is required, trees will be replanted in the areas where trees were removed.

Restoration Actions

Following completion of the crossing, the temporary impact areas on both sides of the crossing will be restored to preconstruction contours, smoothed, and seeded with a stabilizing grass seed mix.

Once the grass cover is established and temporary impact areas are stabilized, the ESC measures will be adjusted in the field and these areas will be removed from the Area of Disturbance. The impact areas will be allowed to naturally revegetate (unmaintained) over time.

If construction requires the removal of trees, each tree removed will be replaced in or near the area where the tree was removed. Planted trees will be ball & burlap or bare root, with minimum 2.5" DBH, warrantied for 1 year. Replacement trees will be planted during the first raining season (Nov – Feb) following completion of the crossing.

Tree species will be selected from the attached table, included as Attachment 4. Replacement trees will be selected by specific site conditions (region/light/moisture).

Attachments:

1. Location Map
2. Site Map w/Impact Area
3. Impact Map
4. Table of Tree Species

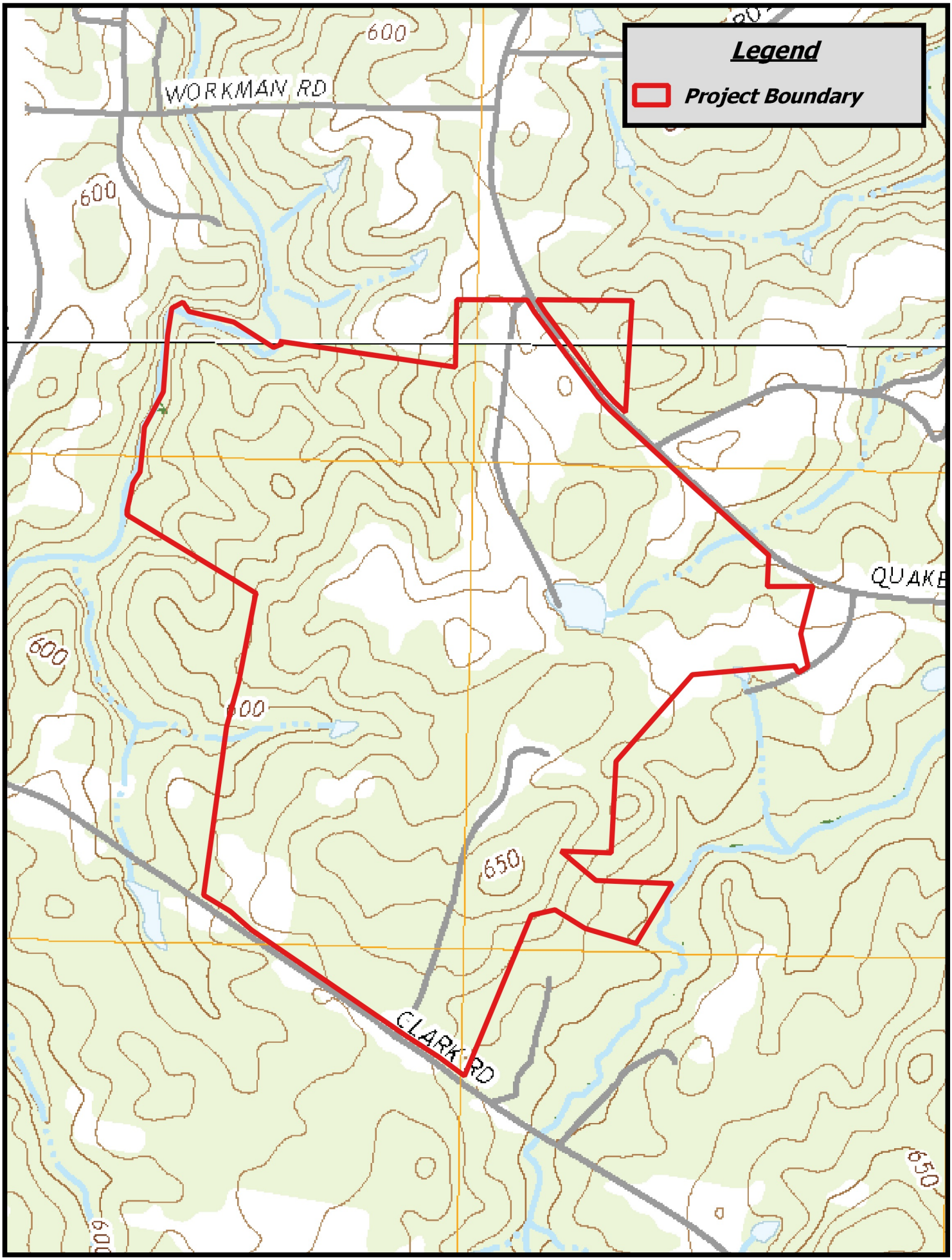


Figure	USGA Topographic Map	Snow Camp Mine	Date
1	Crutchfield Crossroads Quadrangle, 2016 Source: TNM/USGS Mapping Services	342 Clark Road Snow Camp, North Carolina 27349 Alamance County	2/12/20

Figure 1

Project Boundary/Impact Area

Authorization is requested for road crossing w/ bottomless culvert, along Stream 3 as identified in the attached Preliminary Stream & Wetland Map 7-25-18

Snow Camp Mine

342 Clark Road
Snow Camp, North Carolina 27349
Alamance County

Date
2/12/20

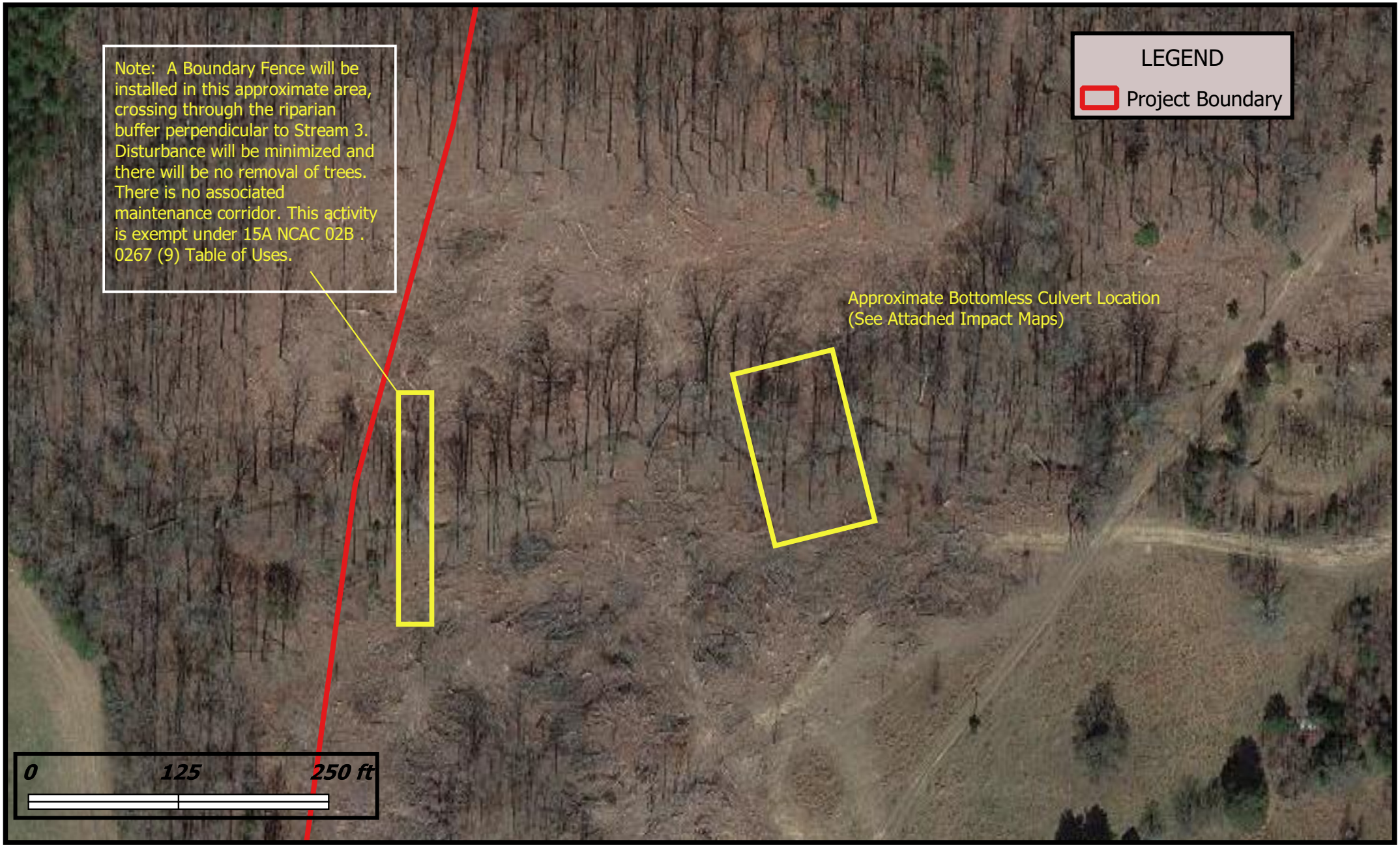


Figure
1A

Riparian Buffer Impact Area

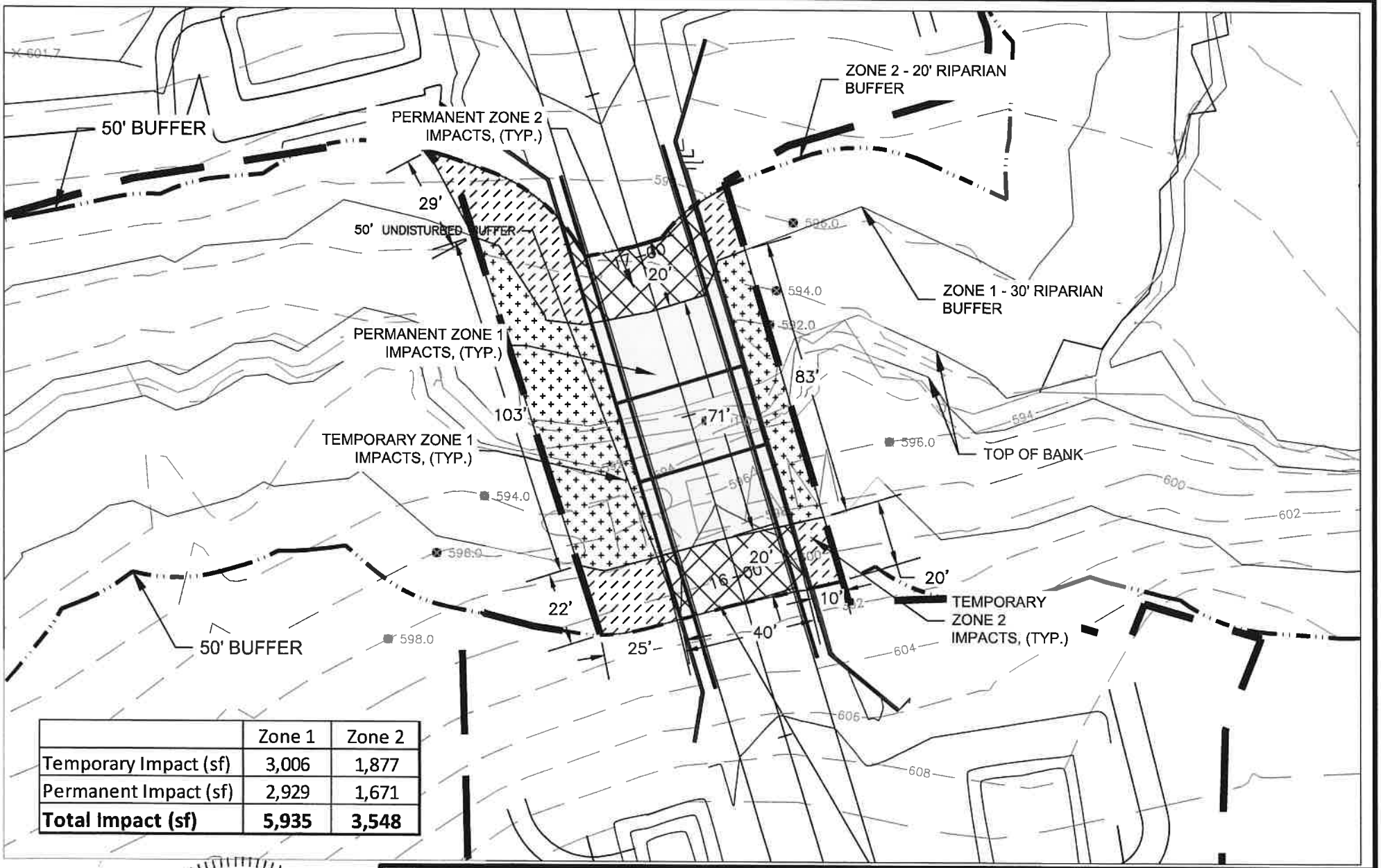
Areas shown are approximate locations.
Surveyed locations and detailed impact maps are attached.

Snow Camp Mine

342 Clark Road
Snow Camp, North Carolina 27349
Alamance County

02/12/2020

Prep By:
WB/MRR



	Zone 1	Zone 2
Temporary Impact (sf)	3,006	1,877
Permanent Impact (sf)	2,929	1,671
Total Impact (sf)	**5,935**	**3,548**

NORTH CAROLINA PROFESSIONAL SEAL 22052 ENGINEER PAUL A. STIMPSON

1/23/2020

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DRAWING NAME: **BRIDGE CULVERT IMPACT FIGURE**
SCALE 1"=40'

PROJECT NAME: **SNOW CAMP MINE**

ISSUED FOR: APPROVAL

DRAWN BY:	DATE:	PROJECT NO.:
KCG	01/21/2020	2190335

DRAWING NUMBER: BRIDGE CULVERT 2.0

Table 15-1
Planting List for Zone 1 (Ecosystem Enhancement Program 2004)

Native Regions		Light Requirements		Moisture Requirements	
M=	Mountains	S=	Shade	L=	Low Moisture
P=	Piedmont	P=	Partial Sun	M=	Moderate Moisture
C=	Coastal Plain	F=	Full Sun	H=	High Moisture
				A=	Aquatic

Scientific Name	Common Name	Region			Light			Moisture			
		M	P	C	S	P	F	L	M	H	A
Medium to Large Trees											
Acer barbatum	Southern sugar maple		X	X	X	X			X		
Acer saccharinum	silver maple		X		X	X	X		X		
Acer saccharum	sugar maple	X				X	X		X		
Betula alleghaniensis	yellow birch	X			X	X			X		
Betula lenta	cherry birch, sweet birch	X			X	X			X		
Betula nigra	river birch	X	X	X		X	X		X	X	
Carya aquatica	water hickory			X		X	X			X	
Carya cordiformis	bitternut hickory	X	X	X	X	X	X		X	X	
Carya glabra	pignut hickory	X	X	X	X	X	X	X	X		
Carya ovata	shagbark hickory	X	X	X	X	X	X		X		
Carya tomentosa	mockernut hickory	X	X	X	X	X	X	X	X		
Celtis laevigata	sugarberry, hackberry		X	X	X	X			X		
Chamaecyparis thyoides	Atlantic white cedar			X		X	X		X	X	
Cladrastis kentuckea	yellowwood	X			X	X			X		
Diospyros virginiana	persimmon	X	X	X	X	X	X	X	X		
Fagus grandifolia	American beech	X	X	X	X	X			X		
Fraxinus americana	white ash	X	X	X	X	X			X		
Fraxinus pennsylvanica	green ash	X	X	X	X	X			X	X	
Fraxinus profunda	pumpkin ash, red ash		X	X		X				X	
Juglans nigra	black walnut	X	X	X	X	X			X		
Liriodendron tulipifera	tulip poplar, yellow poplar	X	X	X	X	X	X		X		
Magnolia acuminata	cucumber magnolia	X	X		X	X			X		
Magnolia fraseri	Fraser magnolia	X				X			X		
Nyssa aquatica	water tupelo			X	X	X	X			X	X
Nyssa sylvatica	black gum	X	X	X	X	X	X	X	X		
Nyssa sylvatica var. biflora	swamp black gum			X	X	X	X			X	
Oxydendrum arboreum	sourwood	X	X	X		X	X	X	X		
Picea rubens	red spruce	X			X	X	X		X		
Pinus echinata	shortleaf pine	X	X	X		X	X	X			
Pinus palustris	longleaf pine		X	X			X	X	X		
Pinus rigida	pitch pine	X					X	X			

Scientific Name	Common Name	Region			Light			Moisture			
		M	P	C	S	P	F	L	M	H	A
Pinus serotina	pond pine			X			X		X	X	
Pinus strobus	white pine	X	X			X	X		X		
Platanus occidentalis	sycamore	X	X	X		X	X		X	X	
Populus deltoides	eastern cottonwood		X	X			X			X	
Populus heterophylla	swamp cottonwood			X		X	X			X	
Prunus serotina	black cherry	X	X	X	X	X	X	X	X		
Quercus alba	white oak	X	X	X		X	X	X	X		
Quercus bicolor	swamp white oak		X		X	X				X	
Quercus coccinea	scarlet oak	X	X		X	X		X			
Quercus falcata	Southern red oak	X	X	X	X	X		X	X		
Quercus pagoda	cherrybark oak		X	X	X	X			X	X	
Quercus laurifolia	laurel oak			X	X	X	X		X	X	
Quercus lyrata	overcup oak		X	X	X	X				X	
Quercus margaretta	sand post oak			X		X	X	X			
Quercus marilandica	black jack oak	X	X	X	X	X		X			
Quercus michauxii	swamp chestnut oak		X	X	X	X	X		X	X	
Quercus nigra	water oak		X	X	X	X	X	X	X		
Quercus phellos	willow oak		X	X	X	X	X		X	X	
Quercus prinus	chestnut oak	X	X		X	X		X			
Quercus rubra	Northern red oak	X	X		X	X		X	X		
Quercus shumardii	shumard oak		X	X	X	X			X	X	
Quercus stellata	post oak	X	X	X	X	X		X			
Quercus velutina	black oak	X	X	X	X	X		X			
Quercus virginiana	live oak			X		X	X	X			
Robinia pseudoacacia	black locust	X	X	X		X	X		X		
Taxodium ascendens	pond-cypress			X		X	X				X
Taxodium distichum	bald-cypress			X		X	X				X
Tilia americana var. heterophylla	basswood	X	X		X	X			X		
Tsuga canadensis	Eastern hemlock	X	X		X	X	X		X		
Tsuga caroliniana	Carolina hemlock	X	X			X	X	X			
Ulmus alata	winged elm		X	X	X	X	X	X	X		
Ulmus americana	American elm	X	X	X	X	X			X		
Small Trees											
Amelanchier arborea	downy serviceberry, shadbush	X	X	X	X	X			X		
Amelanchier canadensis	Canada serviceberry			X			X		X	X	
Amelanchier laevis	smooth serviceberry	X				X	X	X	X		
Asimina triloba	pawpaw	X	X	X	X	X			X		
Carpinus caroliniana	ironwood, American hornbeam	X	X	X	X	X			X	X	
Cercis canadensis	eastern redbud	X	X	X	X	X			X		
Chionanthus virginicus	white fringetree, old man's beard	X	X	X		X	X		X		
Cornus alternifolia	alternate-leaf dogwood	X			X	X			X		
Cornus florida	flowering dogwood	X	X	X	X	X		X	X		
Crateagus crus-galli	cockspur hawthorn	X	X	X		X	X	X	X		
Crateagus flabellata	fanleaf hawthorn	X	X			X			X		
Crateagus flava	October haw	X	X	X		X	X		X		
Cyrilla racemiflora	titi			X		X	X		X	X	
Fraxinus caroliniana	water ash			X	X	X				X	
Gordonia lasianthus	loblolly bay			X	X	X	X		X	X	

Scientific Name	Common Name	Region			Light			Moisture			
		M	P	C	S	P	F	L	M	H	A
Halesia tetraptera (H. carolina)	common silverbell	X	X		X	X			X		
Ilex opaca	American holly	X	X	X	X	X		X	X	X	
Juniperus virginiana	Eastern red cedar	X	X	X		X	X	X	X		
Magnolia tripetala	umbrella tree	X	X		X				X		
Magnolia virginiana	sweetbay magnolia		X	X	X	X	X		X	X	
Morus rubra	red mulberry	X	X	X	X	X			X		
Osmanthus americana	wild olive, devilwood			X	X	X			X		
Ostrya virginiana	Eastern hop-hornbeam	X	X		X	X			X		
Persea borbonia	red bay			X	X	X	X	X	X		
Persea palustris	swamp bay			X	X	X	X		X	X	
Pinus pungens	table mountain pine	X					X	X			
Prunus americana	American wild plum	X	X			X			X		
Prunus caroliniana	Carolina laurel-cherry			X		X	X	X	X		
Quercus incana	bluejack oak			X		X	X	X			
Quercus laevis	turkey oak			X		X	X	X			
Rhus glabra	smooth sumac	X	X				X	X	X		
Rhus hirta (Rhus typhina)	staghorn sumac	X					X	X			
Salix caroliniana	swamp willow	X	X	X		X	X		X	X	
Salix nigra	black willow	X	X	X		X	X		X	X	
Sassafras albidum	sassafras	X	X	X		X	X	X	X		
Staphylea trifolia	bladdernut		X		X				X	X	
Symplocos tinctoria	horse-sugar, sweetleaf	X	X	X	X	X		X	X		
Ulmus rubra	slippery elm	X	X		X	X			X		
Shrubs											
Aesculus sylvatica	painted buckeye	X	X		X	X			X		
*Alnus serrulata**	common alder	X	X	X	X	X	X			X	X
Aronia arbutifolia	red chokeberry	X	X	X	X	X			X	X	
Baccharis halimifolia	silverling		X	X			X	X	X	X	
Callicarpa americana	American beautyberry		X	X	X	X	X		X		
Calycanthus floridus	sweet-shrub	X	X		X	X			X		
Castanea pumila	Allegheny chinkapin	X	X	X	X	X	X	X			
Ceanothus americanus	New Jersey tea	X	X	X		X	X	X			
Cephalanthus occidentalis	buttonbush	X	X	X		X	X				X
Clethra acuminata	mountain sweet pepperbush	X			X	X			X		
Clethra alnifolia	sweet pepperbush			X	X	X			X	X	
Comptonia peregrina	sweet fern	X	X			X	X				
Cornus amomum	silky dogwood	X	X	X	X	X				X	X
Cornus stricta	swamp dogwood			X	X	X				X	
Corylus americana	American hazel, hazelnut	X	X		X	X			X		
Euonymus americanus	hearts-a-bustin', strawberry bush	X	X	X	X	X		X	X		
Fothergilla gardenii	witch-alder			X		X			X	X	
Gaylussacia frondosa	dangleberry			X	X	X	X		X	X	
Hamamelis virginiana	witch hazel	X	X	X	X	X		X	X		
Hydrangea arborescens	wild hydrangea	X	X		X	X			X		
Ilex coriacea	gallberry			X	X	X			X	X	
Ilex decidua	deciduous holly, possumhaw		X	X	X	X			X		
Ilex glabra	inkberry			X	X	X	X		X	X	
Ilex verticillata	winterberry	X	X	X	X	X	X		X	X	

Scientific Name	Common Name	Region			Light			Moisture			
		M	P	C	S	P	F	L	M	H	A
Ilex vomitoria	yaupon holly			X	X	X	X	X			
Itea virginica	Virginia willow		X	X	X	X				X	
Kalmia angustifolia var. caroliniana	lamb-kill, sheep-kill			X		X	X		X	X	
Kalmia latifolia	mountain laurel	X	X		X	X		X	X		
Leucothoe axillaris	coastal dog-hobble			X	X	X			X		
Leucothoe fontanesiana	dog-hobble	X	X		X				X		
Leucothoe racemosa	fetterbush		X	X	X	X			X	X	
Lindera benzoin	spicebush	X	X		X				X		
Lyonia ligustrina	northern maleberry	X	X	X		X			X	X	
Lyonia lucida	shining fetterbush			X	X	X			X		
*Myrica cerifera**	Southern wax-myrtle		X	X	X	X	X	X	X	X	
*Myrica cerifera var. pumila**	dwarf Southern wax-myrtle			X		X	X	X	X		
*Myrica heterophylla**	bayberry, evergreen bayberry			X	X	X			X		
Pieris floribunda	evergreen mountain fetterbush	X					X	X	X		
Rhododendron atlanticum	dwarf azalea			X		X			X		
Rhododendron calendulaceum	flame azalea	X			X	X			X		
Rhododendron catawbiense	Catawba rhododendron	X	X		X	X	X	X	X		
Rhododendron maximum	rosebay rhododendron	X	X		X	X		X	X		
Rhododendron periclymenoides	pinxter flower, wild azalea	X	X	X	X	X			X		
Rhododendron viscosum	swamp azalea	X		X		X	X		X	X	
Rhus copallina	winged sumac	X	X	X		X	X	X	X		
Rosa carolina	pasture rose, Carolina rose	X	X	X		X	X	X	X		
Rosa palustris	swamp rose	X	X	X		X	X				X
Rubus allegheniensis	Alleghany blackberry	X	X				X	X			
Rubus cuneifolius	blackberry		X	X		X	X	X	X		
Rubus odoratus	purple flowering raspberry	X				X			X		
Salix humilis	prairie willow	X	X				X	X			
Salix sericea	silky willow	X	X	X		X	X				X
Sambucus canadensis	common elderberry	X	X	X			X		X	X	
Spiraea alba	narrow-leaved meadowsweet	X					X		X		
Spiraea latifolia	broad-leaved meadowsweet	X					X		X		
Spiraea tomentosa	meadowsweet	X	X	X		X	X			X	
Stewartia malacodendron	silky camellia			X	X	X			X		
Stewartia ovata	mountain camellia	X	X		X	X			X		
Styrax grandifolia	bigleaf snowbell		X	X	X	X			X		
Vaccinium arboreum	sparkleberry		X	X	X	X		X	X		
Vaccinium corymbosum	highbush blueberry	X	X	X	X	X	X	X	X	X	
Vaccinium crassifolium	creeping blueberry			X		X			X		
Vaccinium elliottii	mayberry			X	X				X		
Vaccinium stamineum	deerberry, gooseberry	X	X	X	X	X		X			
Vaccinium pallidum	lowbush blueberry	X	X		X	X		X			
Viburnum acerifolium	maple-leaf viburnum	X	X		X	X		X	X		
Viburnum dentatum	Southern arrowwood viburnum	X	X	X	X	X	X		X		
Viburnum nudum	possumhaw viburnum	X	X	X	X	X				X	
Viburnum prunifolium	blackhaw viburnum	X	X	X	X	X			X		
Viburnum rafinesquianum	downy arrowwood		X		X	X			X		
Viburnum rufidulum	rusty blackhaw		X	X	X	X		X			
Xanthorhiza simplicissima	yellowroot	X	X	X	X			X	X		

** These fix nitrogen and should not be used for riparian restoration adjacent to Nutrient Sensitive Waters.*