

To: Eric Bowman
Environmental Quality Management

Date: October 27, 2011

From: Brian Boyer
Mark Kieser
Kieser & Associates, LLC

cc: Project files

RE: Portage Creek Area Time Critical Removal Action
Project# 030281-0087
Existing Vegetation Assessment

Introduction

Kieser & Associates, LLC (K&A) has been retained by Environmental Quality Management, Inc. (EQM) to provide professional services for an existing vegetation assessment, re-vegetation planning and re-vegetation monitoring associated with the Portage Creek Area Time Critical Removal Action Project in Kalamazoo, Michigan. This technical memorandum summarizes the findings from the first K&A work task associated with existing vegetation assessment efforts.

The Portage Creek project begins at East Alcott Street and will proceed north approximately 1.8 miles to the confluence with the Kalamazoo River. These operations will involve limited clearing and grubbing to provide access for contaminated sediment removal efforts within Portage Creek. Therefore, K&A vegetation assessment efforts were focused on specific riparian areas identified by EQM. Vegetation identification involved emergent and terrestrial plants. The following table summarizes each of the proposed work sites.

Removal Area	Channel Center Length (in feet)	Surface Area of Removal (in acres)
SA 1-A	252	0.45
SA 1-B	52	0.03
SA 1-C	231	0.18
SA 3-A	348	0.41
SA 5-A	447	0.32
SA 5-C	404	0.32
SA 5-Axtell Creek	507	0.23
SA 5-D	989	0.84
SA 6	915	0.72
SA 7	267	0.26
Total	4,412	3.76

A site location map depicting the location of each Portage Creek sediment removal work site, with respect each other and local surrounding features, is provided as Figure 1.

Work Summary and Findings

K&A personnel accessed each proposed sediment removal work site on foot to assess the existing vegetation species present within the designated future clearing and grubbing areas defined by EQM. This vegetation evaluation was a qualitative assessment of the vegetation and community type present at each proposed work site. In general, existing vegetation observed was quite typical of species located within an urban floodplain and riparian forest community.

Field notes were recorded for each site to document existing plant species observed, large trees present and general community type. Vegetation observed by K&A personnel at each site were referenced against the Michigan Natural Features Inventory list of Michigan's Special Plants (MNFI, 2010). None of the existing vegetation species observed within the proposed Portage Creek work sites were listed on the Michigan Special Plants list. With the exception of Site SA1-B, all sites had at least one exotic species present (i.e., not native to Michigan).

A summary of all existing vegetation species observed within the ten future clearing and grubbing areas along Portage Creek is provided as Table 1 and Table 2 for native and exotic plants, respectively. An "x" within each summary table indicates vegetation species present at each site. Both the common name and scientific name are provided for each species observed wherever possible.

Some examples of predominant existing native vegetation (common to several sites) include:

- | | |
|---------------------|----------------------|
| ○ Silver Maple | ○ Northern catalpa |
| ○ Staghorn Sumac | ○ American elm |
| ○ Poison Ivy | ○ Box elder |
| ○ Virginia Creeper | ○ Red maple |
| ○ Grapevine | ○ Late goldenrod |
| ○ Green ash | ○ Black willow |
| ○ Swamp rose mallow | ○ Eastern cottonwood |
| ○ Common ragweed | |

A few of these predominant native species are undesirable for future re-vegetation planning. These undesirable natives include: poison ivy (allergen to some people), green ash (susceptible to the ash borer) and common ragweed (allergen to some people). Other natives that were observed at a few sites that will be excluded from future re-vegetation planning include:

- Green foxtail (can be invasive)
- Pokeweed (poisonous to humans)
- Hedge bindweed (appears on MI noxious species list)

Some examples of predominant existing exotic vegetation (common to several sites) include:

- Common buckthorn
- Purple loosestrife
- Stinging nettles
- Nightshade
- Reed canary grass

All of the observed exotic vegetation is undesirable for future re-vegetation planning and will be excluded from such consideration.

Detailed site location maps and vegetation summary tables unique to each of the ten proposed future work sites are provided as Figures 2 through 11. Select photographs were also taken to document conditions at each location (refer to Attachment A).

This existing vegetation information will be relied upon for the next K&A work task: preparation of re-vegetation design plans. It is our understanding that EQM will also use this information to solicit local stakeholder input related to desired re-vegetation species for each of the ten Portage Creek work sites.

References

Michigan Natural Features Inventory (MNFI) list of *Michigan's Special Plants: Endangered, Threatened, Special Concern and Probably Extirpated*, August 26, 2010.

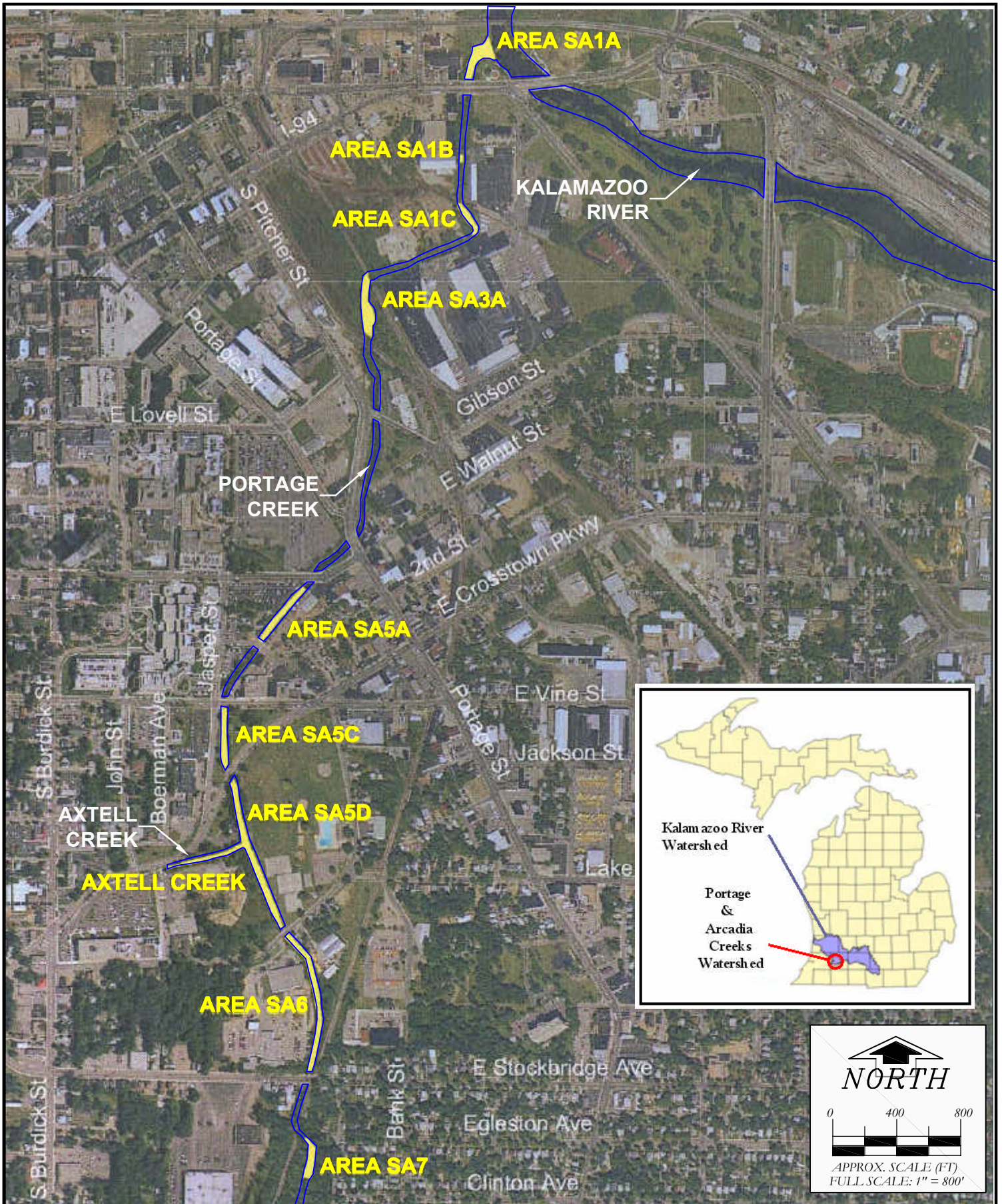
Michigan Department of Agriculture and Rural Development Website. Prohibited and Restricted Noxious Weed Seeds. <http://www.michigan.gov/mdard/0,4610,7-125-1568_2390_41275-149078--,00.html>

Table 1. Summary of Observed Native Vegetation at All Proposed Work Sites along Portage Creek in Kalamazoo, MI.

Common Name	Scientific Name	Site Number									
		SA1-A	SA1-B	SA1-C	SA3-A	SA5-A	SA5-C	SA5-D	SA5-Axtell	SA6	SA7
Native											
Silver Maple	<i>Acer saccharinum</i>	x	x	x	x		x	x		x	x
Staghorn Sumac	<i>Rhus typhina</i>	x		x	x	x		x		x	x
Poison Ivy	<i>Toxicodendrens radicans</i>	x	x	x	x		x	x		x	x
Virginia Creeper	<i>Parthenocissus quenequefolia</i>	x			x			x	x	x	x
Grapevine	<i>Vitis riparia</i>	x	x	x	x	x	x	x	x	x	x
Green ash	<i>Fraxinus pennsylvanica</i>	x	x	x		x		x	x	x	
Swamp rose mallow	<i>Hibiscus palustris</i>	x		x			x				
Common ragweed	<i>Ambrosia artemisiifolia</i>	x			x			x			
Northern catalpa	<i>Catalpa speciosa</i>	x	x	x	x	x		x		x	
American elm	<i>Ulmus americana</i>	x			x	x	x	x		x	x
Box elder	<i>Acer negundo</i>	x	x		x	x	x	x	x	x	x
Red maple	<i>Acer rubrum</i>		x	x		x		x	x		
Late goldenrod	<i>Solidago gigantea</i>			x	x			x	x	x	
Black willow	<i>Salix nigra</i>			x				x	x	x	
Eastern cottonwood	<i>Populus deltoides</i>			x	x	x			x	x	x
White thoroughwort	<i>Eupatorium leucolepis</i>			x							
Smartweed	<i>Polygonium coccineum</i>			x			x	x			
Thin-leaved coneflower	<i>Rudbeckia triloba</i>				x						
Wood sorrel	<i>Oxalis montana</i>				x						
Green foxtail	<i>Setaria viridis</i>				x						
Fowl meadow grass	<i>Glyceria striata</i>				x						
Violet	<i>Viola sp.</i>				x						x
Washington hawthorn	<i>Crataegus phaenopyrum</i>				x		x				x
Blue flag iris	<i>Iris versicolor</i>				x		x				x
Evening primrose	<i>Oenothera biennis</i>				x		x	x			
Rush aster	<i>Aster junciformis</i>				x		x	x			
Common milkweed	<i>Asclepias syriaca</i>					x		x		x	
Aster sp.	<i>Asteraceae</i>					x				x	
Crab apple	<i>Malus sp.</i>					x		x			
Arrowhead	<i>Sagittaria latifolia</i>						x				
Water pepper (smartweed)	<i>Polygonium hydropiper</i>						x				
Honey locust	<i>Gleditsia triacanthos</i>						x	x		x	
Elderberry	<i>Sambucus canadensis</i>						x	x	x	x	
Hedge bindweed	<i>Convolvulus sepium</i>						x				
Jewelweed	<i>Impatiens capensis</i>						x	x			x
Swamp milkweed	<i>Asclepias incarnata</i>						x				
Sweet coneflower	<i>Rudbeckia subtomentosa</i>						x				
Pokeweed	<i>Phytolacca americana</i>						x	x		x	
Bur Oak	<i>Quercus macrocarpa</i>						x				
Kentucky bluegrass	<i>Poa pretensis</i>							x			
Hedge nettle	<i>Stachys sp.</i>							x			
Horse nettle	<i>Solanum carolinense</i>							x			
Sassafras	<i>Sassafras albidum</i>								x		
Black walnut	<i>Juglans nigra</i>								x		
Pin oak	<i>Quercus palustris</i>									x	
Raspberry	<i>Rubus sp.</i>									x	
Turf grass							x		x		x

Table 2. Summary of Observed Exotic Vegetation at All Proposed Work Sites along Portage Creek in Kalamazoo, MI.

Common Name	Scientific Name	Site Number									
		SA1-A	SA1-B	SA1-C	SA3-A	SA5-A	SA5-C	SA5-D	SA5-Axtell	SA6	SA7
Exotic											
Common buckthorn	Rhamnus cathartica	x		x	x	x	x	x	x	x	x
Purple loosestrife	Lythrum salicaria	x		x		x	x	x	x	x	
Stinging nettles	Urtica dioica					x	x	x			x
Nightshade	Solanum dulcamara			x	x	x				x	
Common mullein	Verbascum thapsus				x						
Queen Anne's lace	Daucus carota				x			x			
Reed canary grass	Phalaris arundinacea				x		x	x		x	x
Myrtle	Vinca minor				x			x	x		x
Tree of Heaven	Ailanthus altissima					x		x			
Curled dock	Rumex crispus					x					
Chicory	Cichorium intybus						x	x			
Honeysuckle	Lonicera sp.							x	x		
Autumn olive	Elaeagnus umbellata							x			
Teasel	Dipsacus sylvestris							x			
Burning bush	Euonymus atropurpureus							x		x	
Ground ivy	Glechoma hederacea							x			
Broad dock	Rumex obtusifolius							x			x
Field sow thistle	Sonchus arvensis							x			
Japanese knotweed	Fallopia Japonica									x	
Burdock	Arctium minor										x
Black jetbead	Rhodotypos scandens								x		

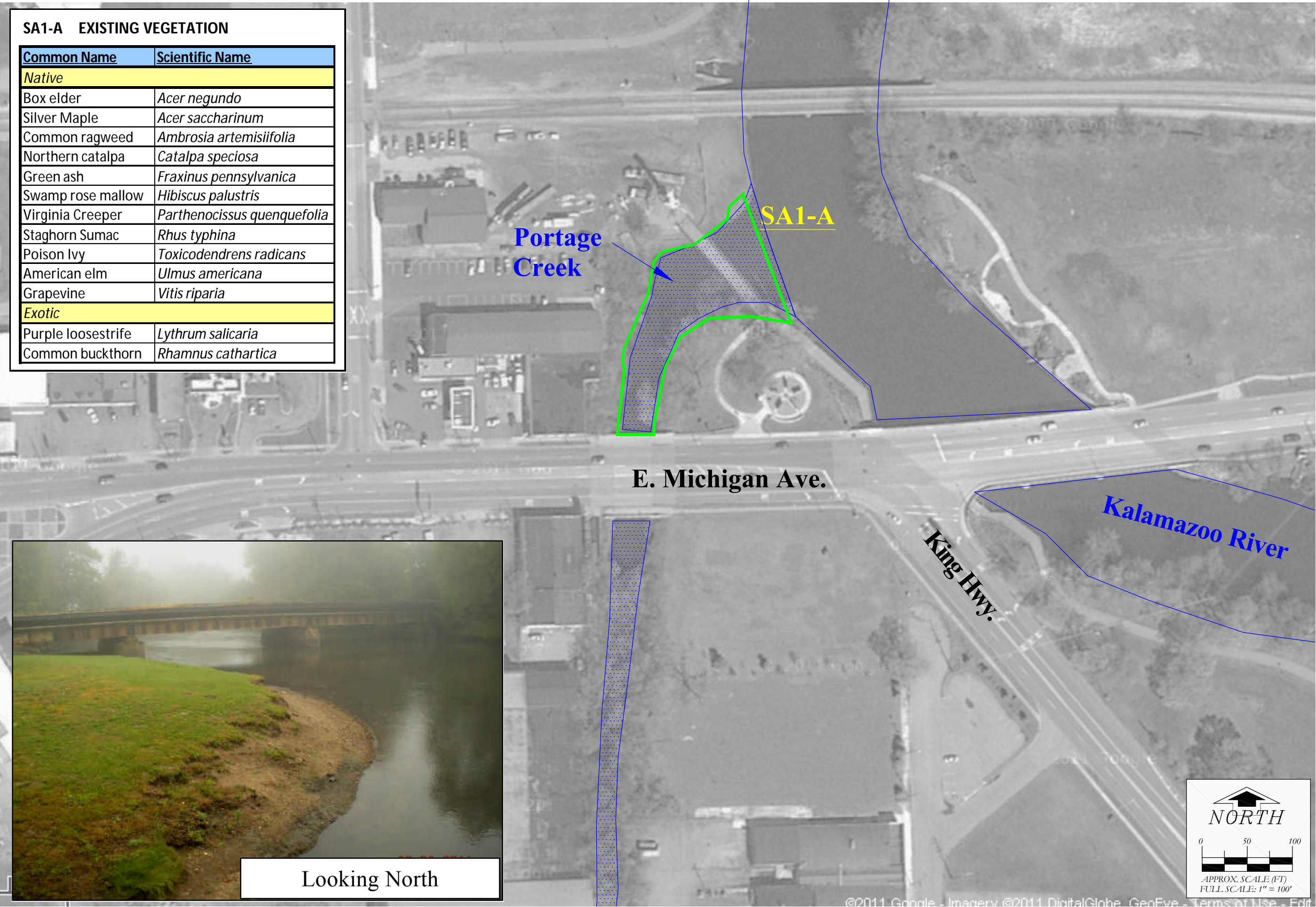


SA1-A EXISTING VEGETATION

Common Name	Scientific Name
Native	
Box elder	<i>Acer negundo</i>
Silver Maple	<i>Acer saccharinum</i>
Common ragweed	<i>Ambrosia artemisiifolia</i>
Northern catalpa	<i>Catalpa speciosa</i>
Green ash	<i>Fraxinus pennsylvanica</i>
Swamp rose mallow	<i>Hibiscus palustris</i>
Virginia Creeper	<i>Parthenocissus quencefolia</i>
Staghorn Sumac	<i>Rhus typhina</i>
Poison Ivy	<i>Toxicodendrens radicans</i>
American elm	<i>Ulmus americana</i>
Grapevine	<i>Vitis riparia</i>
Exotic	
Purple loosestrife	<i>Lythrum salicaria</i>
Common buckthorn	<i>Rhamnus cathartica</i>



Looking North



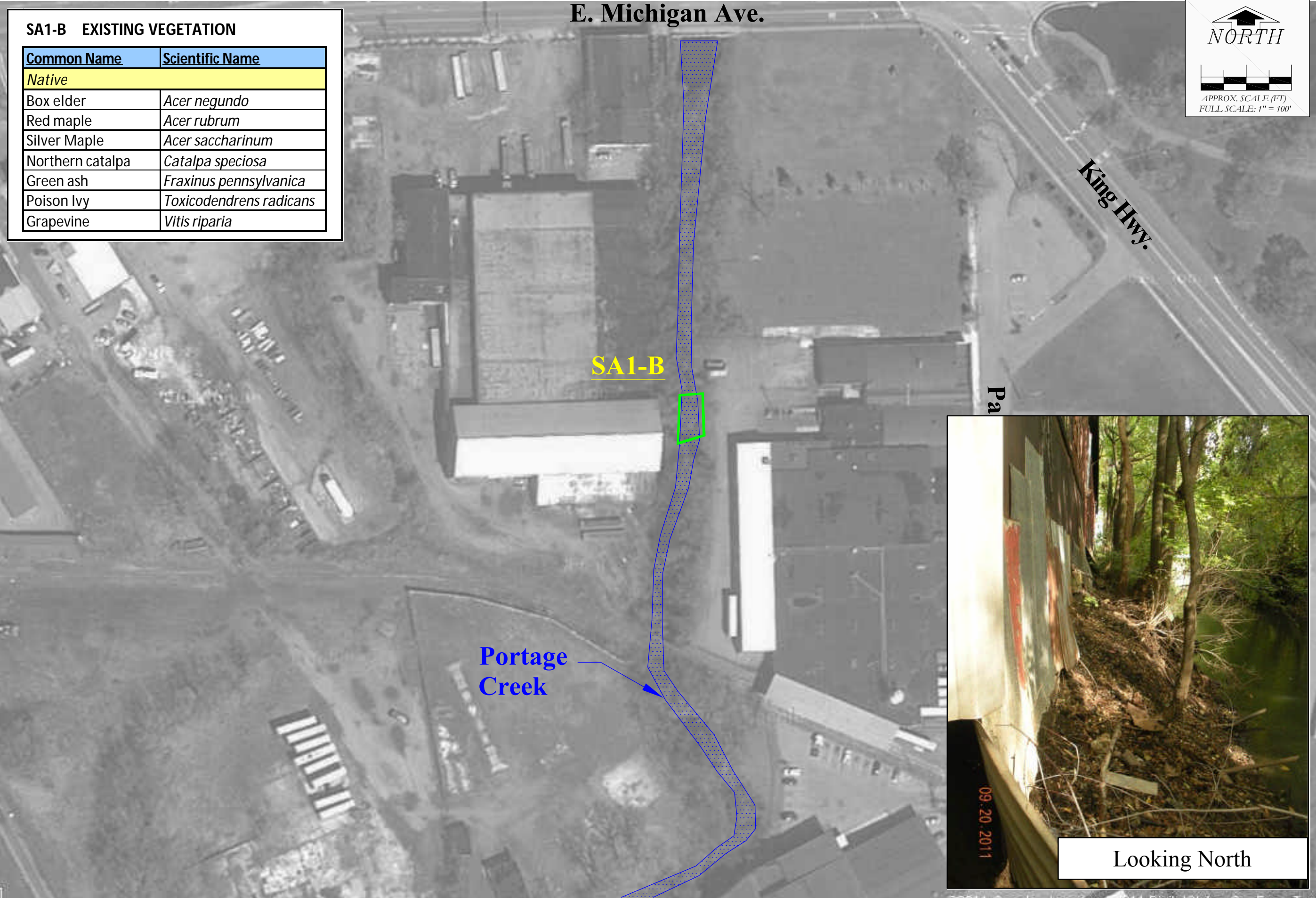


FIGURE
3

Portage Creek Area Time Critical Removal Action
KALAMAZOO, MI
EQM Project Number: 030281.0087
PORTAGE CREEK SITE SA 1-B

SA1-C EXISTING VEGETATION

Common Name	Scientific Name
Native	
Red maple	<i>Acer rubrum</i>
Silver Maple	<i>Acer saccharinum</i>
Northern catalpa	<i>Catalpa speciosa</i>
White thoroughwort	<i>Eupatorium leucolepis</i>
Green ash	<i>Fraxinus pennsylvanica</i>
Swamp rose mallow	<i>Hibiscus palustris</i>
Smartweed	<i>Polygonium coccineum</i>
Eastern cottonwood	<i>Populus deltoides</i>
Staghorn Sumac	<i>Rhus typhina</i>
Black willow	<i>Salix nigra</i>
Late goldenrod	<i>Solidago gigantea</i>
Poison Ivy	<i>Toxicodendrens radicans</i>
Grapevine	<i>Vitis riparia</i>
Exotic	
Purple loosestrife	<i>Lythrum salicaria</i>
Common buckthorn	<i>Rhamnus cathartica</i>
Nightshade	<i>Solanum dulcamara</i>

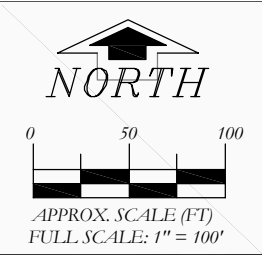
E. Michigan Ave.

King Hwy.

Parkway Dr.

Portage
Creek

SA1-C



Looking South

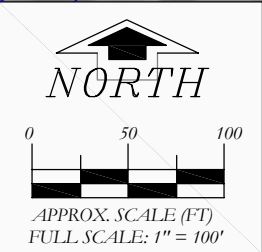
SA3-A EXISTING VEGETATION

Common Name	Scientific Name
Native	
Box elder	Acer negundo
Silver Maple	Acer saccharinum
Common ragweed	Ambrosia artemisiifolia
Rush aster	Aster junciformis
Northern catalpa	Catalpa speciosa
Washington hawthorn	Crataegus phaenopyrum
Fowl meadow grass	Glyceria striata
Blue flag iris	Iris versicolor
Evening primrose	Oenothera biennis
Wood sorrel	Oxalis montana
Virginia Creeper	Parthenocissus quenequefolia
Eastern cottonwood	Populus deltoides
Staghorn Sumac	Rhus typhina
Thin-leaved coneflower	Rudbeckia triloba
Green foxtail	Setaria viridis
Late goldenrod	Solidago gigantea
Poison Ivy	Toxicodendrens radicans
American elm	Ulmus americana
Violet	Viola sp.
Grapevine	Vitis riparia
Exotic	
Queen Anne's lace	Daucus carota
Reed canary grass	Phalaris arundinacea
Common buckthorn	Rhamnus cathartica
Nightshade	Solanum dulcamara
Common mullein	Verbascum thapsus
Myrtle	Vinca minor

Portage
Creek

SA3-A

S. Pitcher St.



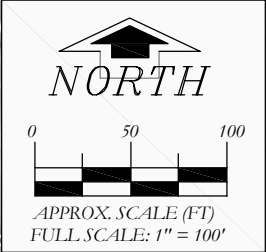
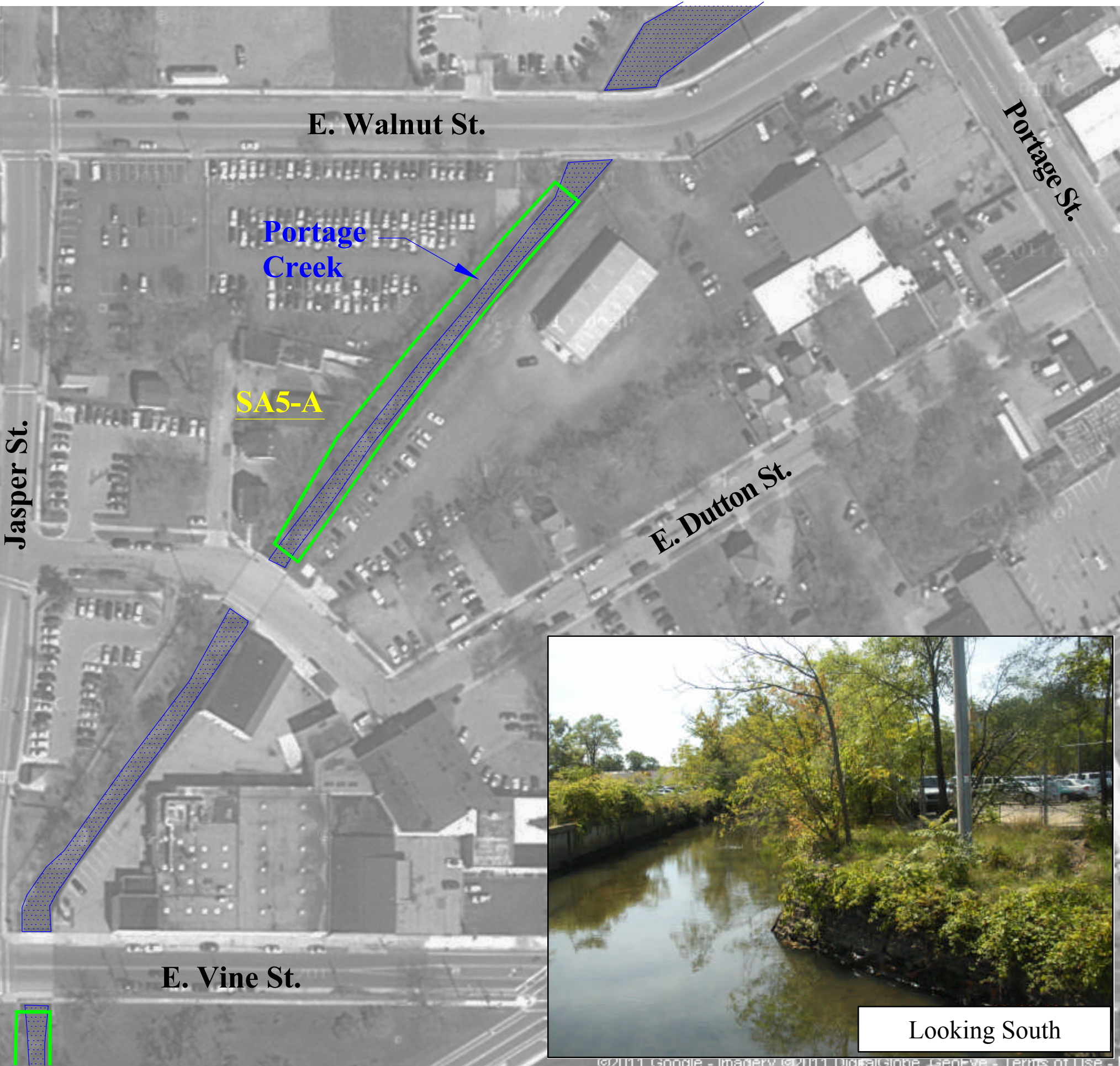
Looking East

FIGURE
5

Portage Creek Area Time Critical Removal Action
KALAMAZOO, MI
EQM Project Number: 030281.0087
PORTAGE CREEK SITE SA 3-A

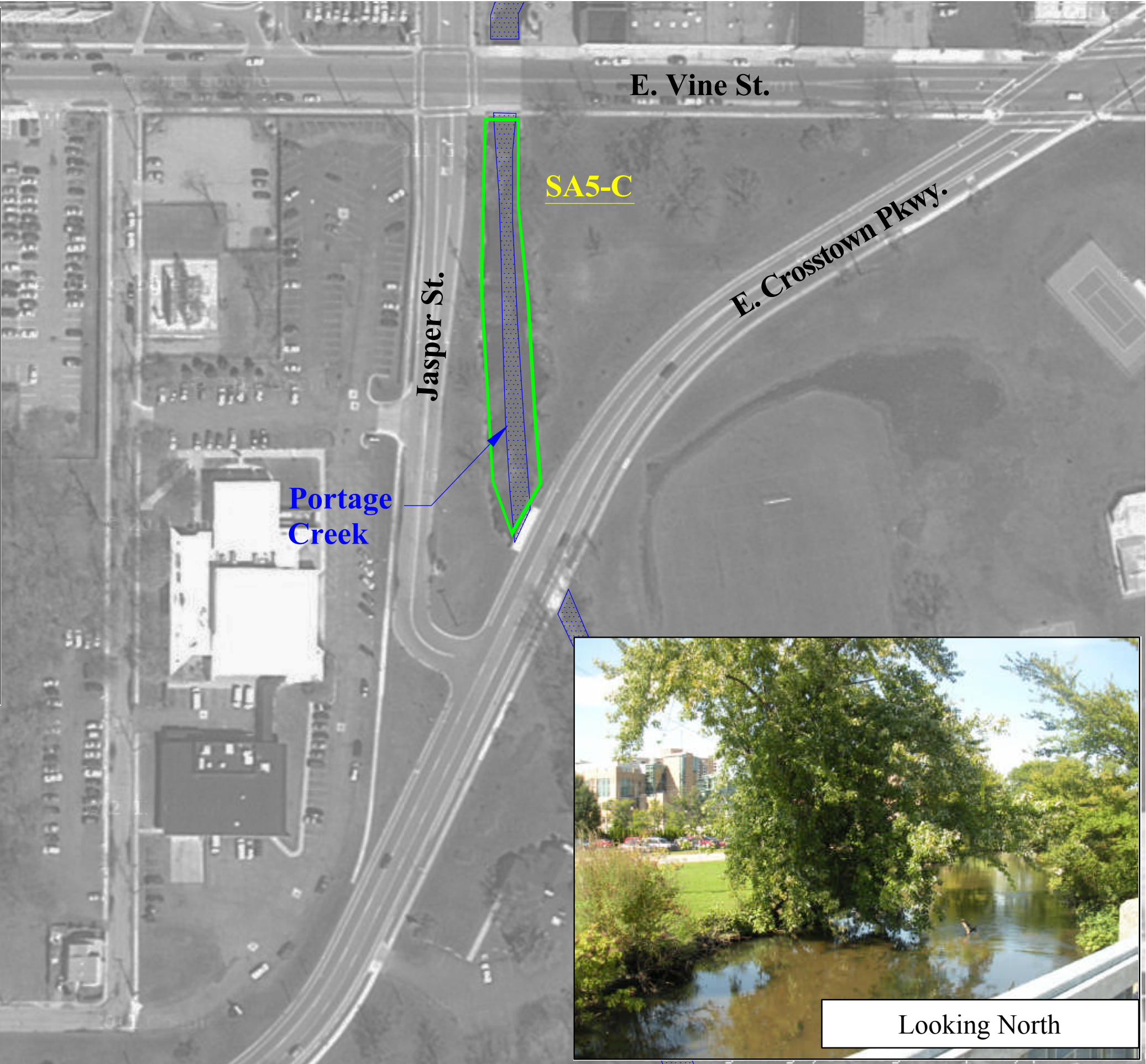
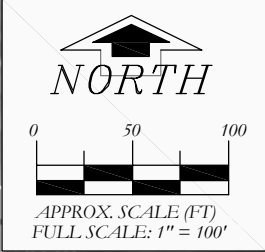
SA5-A EXISTING VEGETATION

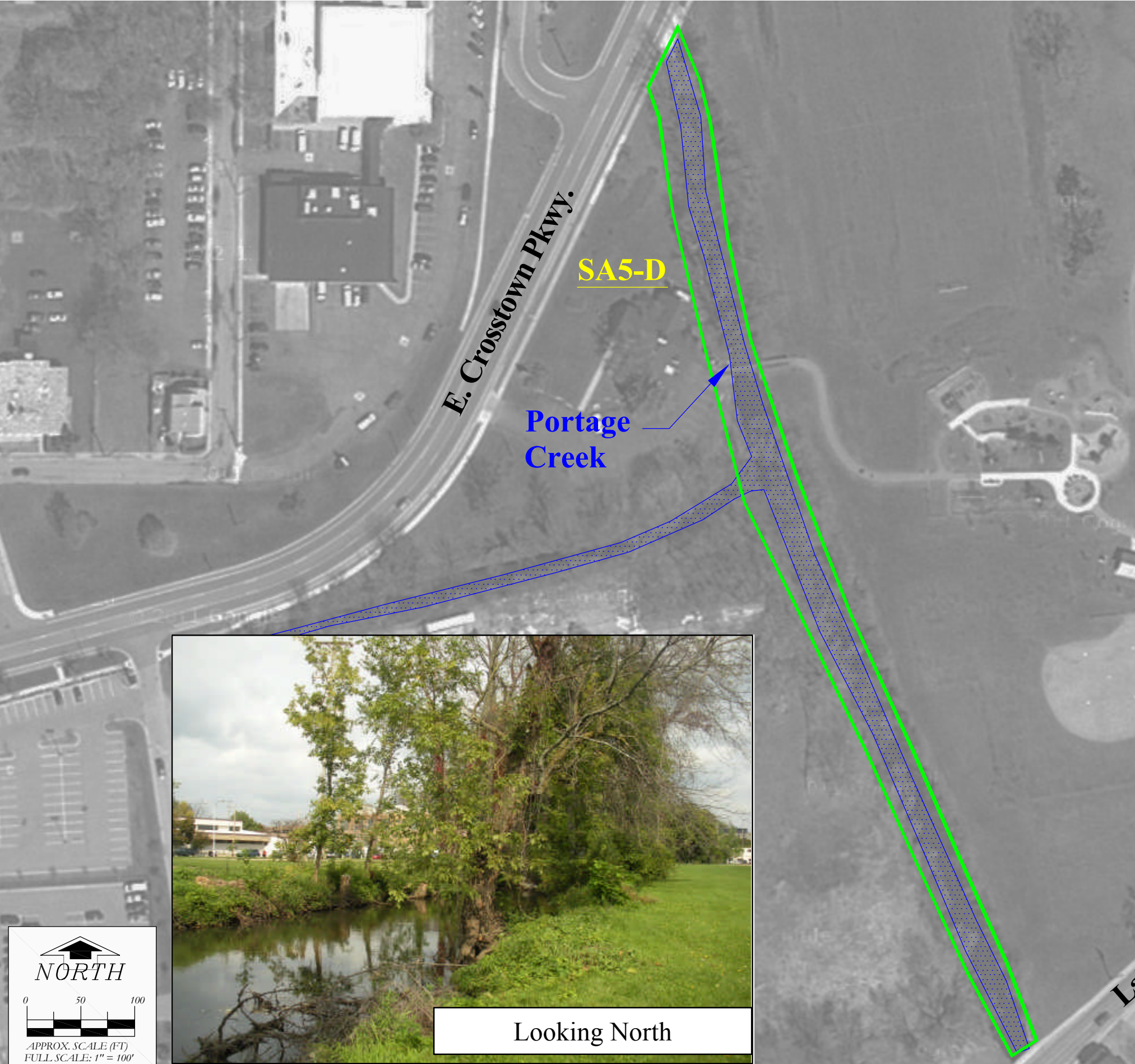
Common Name	Scientific Name
Native	
Staghorn Sumac	<i>Rhus typhina</i>
Grapevine	<i>Vitis riparia</i>
Green ash	<i>Fraxinus pennsylvanica</i>
Northern catalpa	<i>Catalpa speciosa</i>
American elm	<i>Ulmus americana</i>
Box elder	<i>Acer negundo</i>
Red maple	<i>Acer rubrum</i>
Eastern cottonwood	<i>Populus deltoides</i>
Common milkweed	<i>Asclepias syriaca</i>
Aster sp.	<i>Asteraceae</i>
Crab apple	<i>Malus sp.</i>
Exotic	
Common buckthorn	<i>Rhamnus cathartica</i>
Purple loosestrife	<i>Lythrum salicaria</i>
Stinging nettles	<i>Urtica dioica</i>
Nightshade	<i>Solanum dulcamara</i>
Tree of Heaven	<i>Ailanthus altissima</i>
Curled dock	<i>Rumex crispus</i>



SA5-C EXISTING VEGETATION

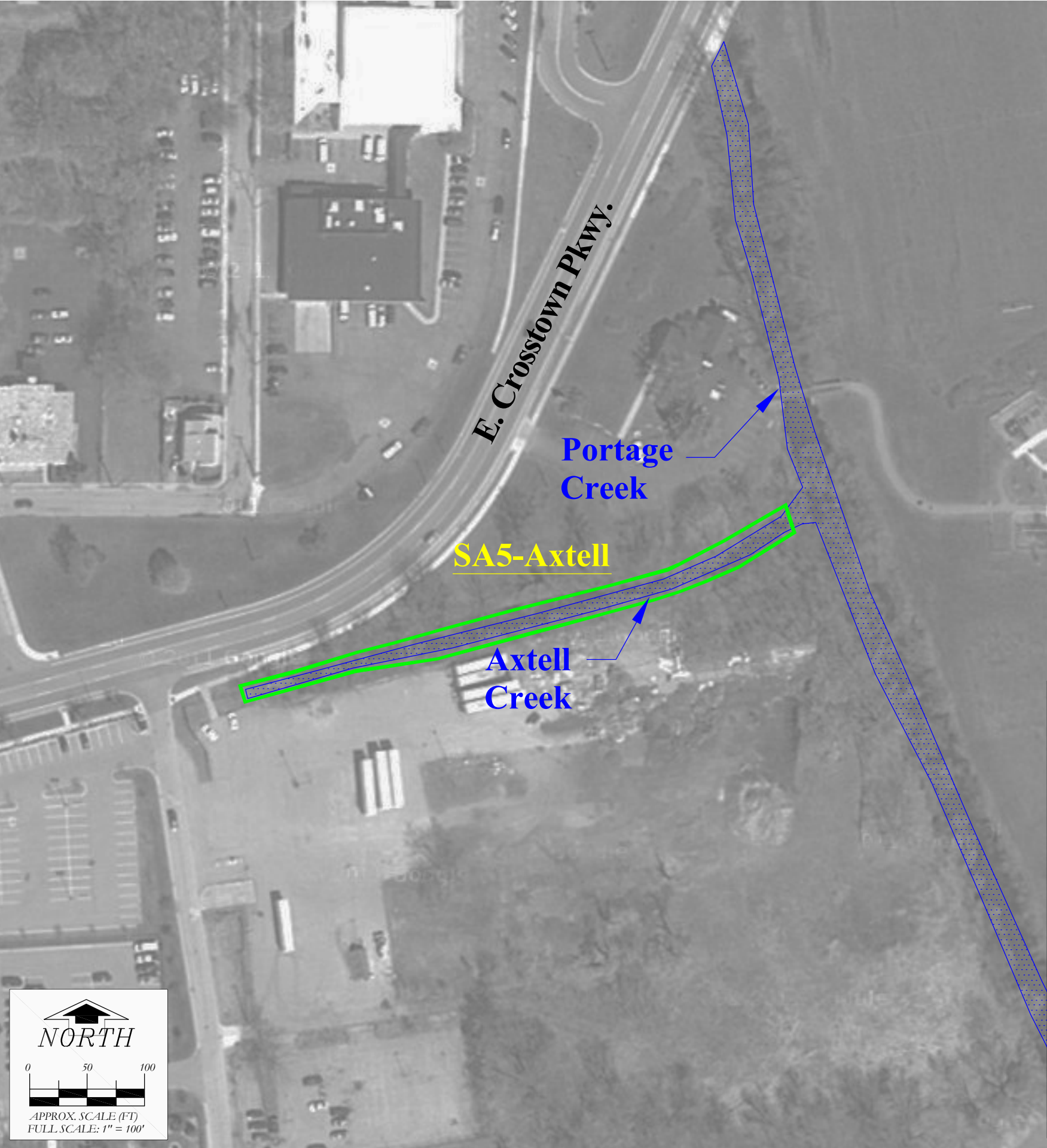
Common Name	Scientific Name
Native	
Box elder	<i>Acer negundo</i>
Silver Maple	<i>Acer saccharinum</i>
Swamp milkweed	<i>Asclepias incarnata</i>
Rush aster	<i>Aster junciformis</i>
Hedge bindweed	<i>Convolvulus sepium</i>
Washington hawthorn	<i>Crataegus phaenopyrum</i>
Honey locust	<i>Gleditsia triacanthos</i>
Swamp rose mallow	<i>Hibiscus palustris</i>
Jewelweed	<i>Impatiens capensis</i>
Blue flag iris	<i>Iris versicolor</i>
Evening primrose	<i>Oenothera biennis</i>
Reed canary grass	<i>Phalaris arundinacea</i>
Pokeweed	<i>Phytolacca americana</i>
Smartweed	<i>Polygonum coccineum</i>
Water pepper (smartweed)	<i>Polygonum hydropiper</i>
Bur Oak	<i>Quercus macrocarpa</i>
Sweet coneflower	<i>Rudbeckia subtomentosa</i>
Arrowhead	<i>Sagittaria latifolia</i>
Elderberry	<i>Sambucus canadensis</i>
Poison Ivy	<i>Toxicodendrens radicans</i>
American elm	<i>Ulmus americana</i>
Grapevine	<i>Vitis riparia</i>
Exotic	
Chicory	<i>Cichorium intybus</i>
Purple loosestrife	<i>Lythrum salicaria</i>
Common buckthorn	<i>Rhamnus cathartica</i>
Stinging nettles	<i>Urtica dioica</i>
Turf grass	





SA5-D EXISTING VEGETATION

Common Name	Scientific Name
Native	
Silver Maple	Acer saccharinum
Staghorn Sumac	Rhus typhina
Poison Ivy	Toxicodendrens radicans
Virginia Creeper	Parthenocissus quenequefolia
Grapevine	Vitis riparia
Green ash	Fraxinus pennsylvanica
Ragweed	Ambrosia artemisiifolia
Northern catalpa	Catalpa speciosa
American elm	Ulmus americana
Box elder	Acer negundo
Red maple	Acer rubrum
Late goldenrod	Solidago gigantea
Black willow	Salix nigra
Smartweed	Polygonium coccineum
Evening primrose	Oenothera biennis
Rush aster	Aster junciformis
Common milkweed	Asclepias syriaca
Crab apple	Malus sp.
Honey locust	Gleditsia triacanthos
Elderberry	Sambucus canadensis
Jewelweed	Impatiens capensis
Pokeweed	Phytolacca americana
Kentucky bluegrass	Poa pretensis
Hedge nettle	Stachys sp.
Horse nettle	Solanum carolinense
Exotic	
Common buckthorn	Rhamnus cathartica
Purple loosestrife	Lythrum salicaria
Stinging nettles	Urtica dioica
Queen Anne's lace	Daucus carota
Reed canary grass	Phalaris arundinacea
Myrtle	Vinca minor
Tree of Heaven	Ailanthus altissima
Chickory	Cichorium intybus
Honeysuckle	Lonicera sp.
Autumn olive	Elaeagnus umbellata
Teasel	Dipsacus sylvestris
Burning bush	Euonymus atropurpureus
Ground ivy	Glechoma hederacea
Broad dock	Rumex obtusifolius
Field sow thistle	Sonchus arvensis



SA5-Axtell EXISTING VEGETATION

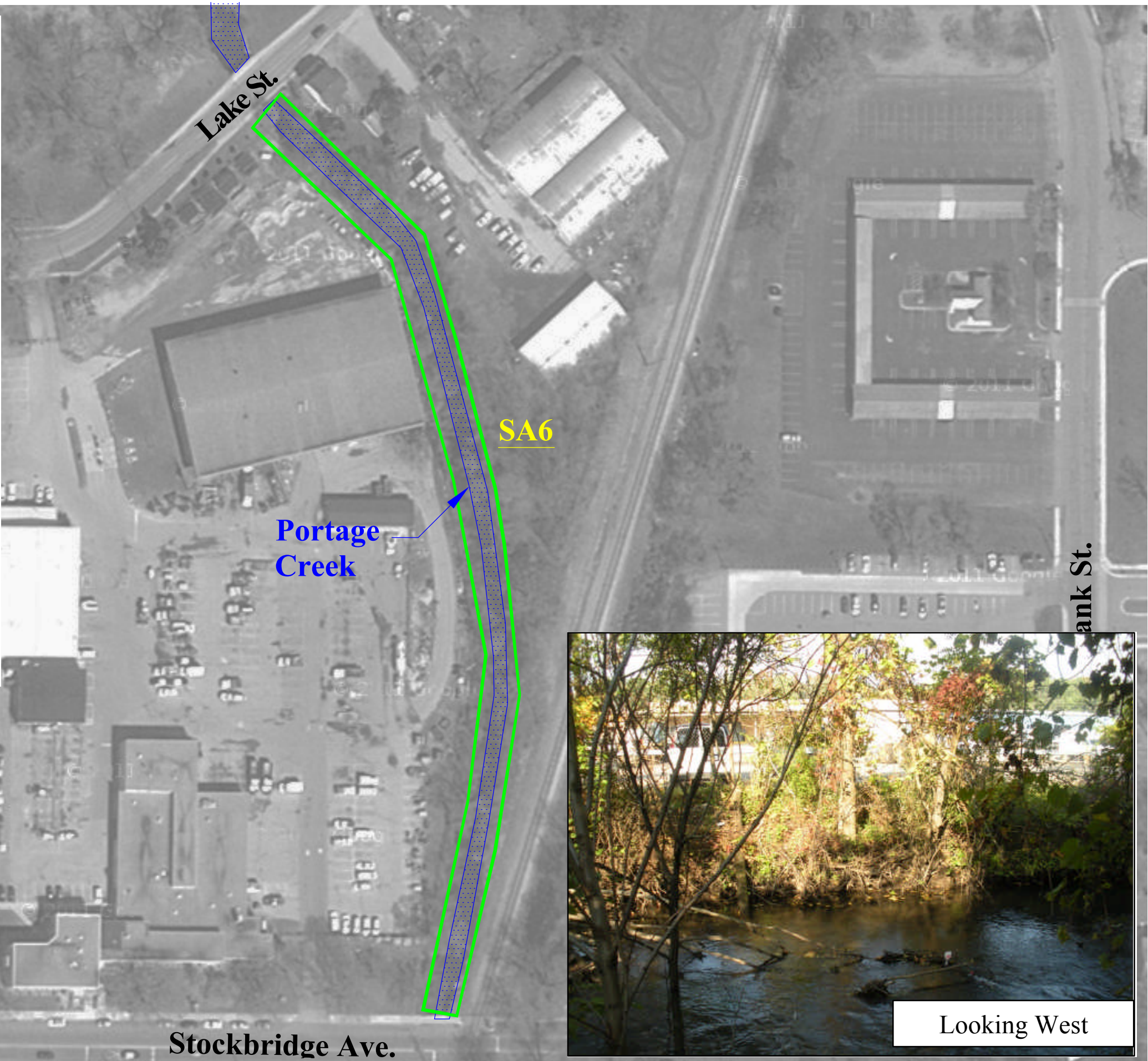
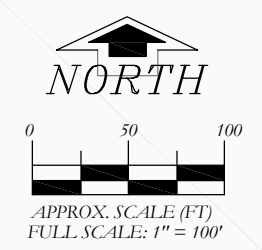
Common Name	Scientific Name
Native	
Box elder	Acer negundo
Red maple	Acer rubrum
Green ash	Fraxinus pennsylvanica
Black walnut	Juglans nigra
Virginia Creeper	Parthenocissus quinquifolia
Eastern cottonwood	Populus deltoides
Black willow	Salix nigra
Elderberry	Sambucus canadensis
Sassafras	Sassafras albidum
Late goldenrod	Solidago gigantea
Grapevine	Vitis riparia
Turf grass	
Exotic	
Honeysuckle	Lonicera sp.
Purple loosestrife	Lythrum salicaria
Common buckthorn	Rhamnus cathartica
Black jetbead	Rhodotypos scandens
Myrtle	Vinca minor



Looking South

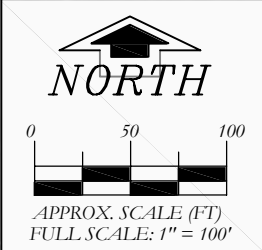
SA6 EXISTING VEGETATION

Common Name	Scientific Name
Native	
Box elder	<i>Acer negundo</i>
Silver Maple	<i>Acer saccharinum</i>
Common milkweed	<i>Asclepias syriaca</i>
Aster sp.	<i>Asteraceae</i>
Northern catalpa	<i>Catalpa speciosa</i>
Green ash	<i>Fraxinus pennsylvanica</i>
Honey locust	<i>Gleditsia triacanthos</i>
Purple loosestrife	<i>Lythrum salicaria</i>
Virginia Creeper	<i>Parthenocissus quencefolia</i>
Pokeweed	<i>Phytolacca americana</i>
Eastern cottonwood	<i>Populus deltoides</i>
Pin oak	<i>Quercus palustris</i>
Staghorn Sumac	<i>Rhus typhina</i>
Raspberry	<i>Rubus sp.</i>
Black willow	<i>Salix nigra</i>
Elderberry	<i>Sambucus canadensis</i>
Late goldenrod	<i>Solidago gigantea</i>
Poison Ivy	<i>Toxicodendrens radicans</i>
American elm	<i>Ulmus americana</i>
Grapevine	<i>Vitis riparia</i>
Exotic	
Burning bush	<i>Euonymus atropurpureus</i>
Japanese knotweed	<i>Fallopia Japonica</i>
Reed canary grass	<i>Phalaris arundinacea</i>
Common buckthorn	<i>Rhamnus cathartica</i>
Nightshade	<i>Solanum dulcamara</i>



SA7 EXISTING VEGETATION

Common Name	Scientific Name
Native	
Box elder	<i>Acer negundo</i>
Silver Maple	<i>Acer saccharinum</i>
Washington hawthorn	<i>Crataegus phaenopyrum</i>
Jewelweed	<i>Impatiens capensis</i>
Blue flag iris	<i>Iris versicolor</i>
Virginia Creeper	<i>Parthenocissus quinquifolia</i>
Reed canary grass	<i>Phalaris arundinacea</i>
Eastern cottonwood	<i>Populus deltoides</i>
Poison Ivy	<i>Toxicodendrens radicans</i>
American elm	<i>Ulmus americana</i>
Grapevine	<i>Vitis riparia</i>
Violet	
Turf grass	
Exotic	
Burdock	<i>Arctium minor</i>
Common buckthorn	<i>Rhamnus cathartica</i>
Wide dock	<i>Rumex obtusifolius</i>
Stinging nettles	<i>Urtica dioica</i>
Myrtle	<i>Vinca minor</i>



ATTACHMENT A

Select Photograph Documentation from each Portage Creek Project Site



Portage Creek Area Time Critical Removal Action

Kalamazoo, Michigan

Site Photographs

Existing Vegetation Observations

September 20 and 21, 2011

Site SA 1-A Photographs



Looking North



Looking West

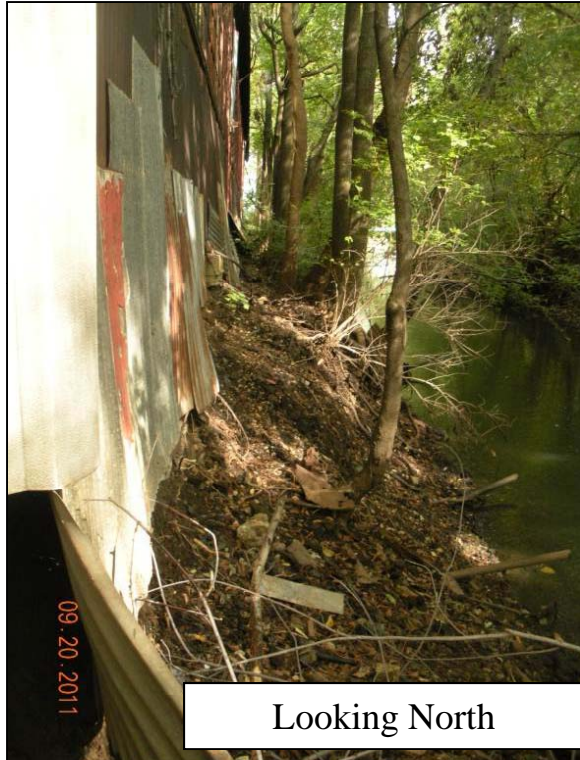


Looking North

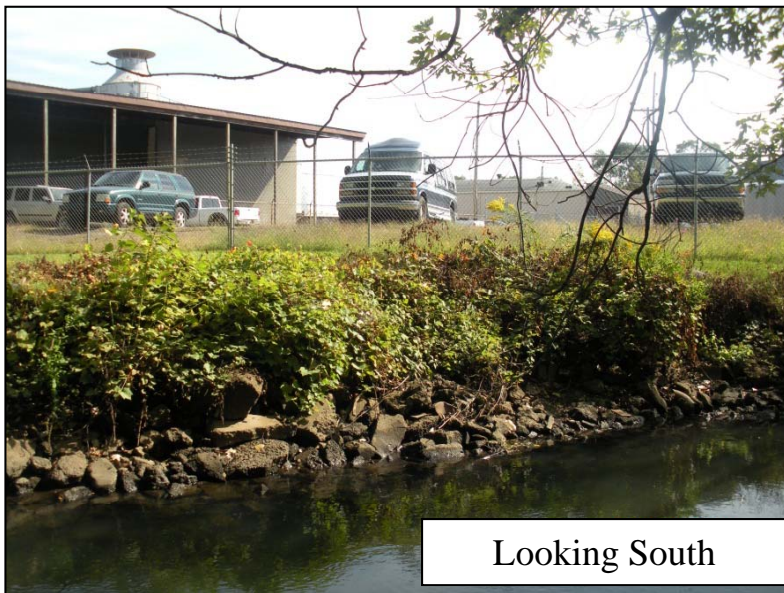
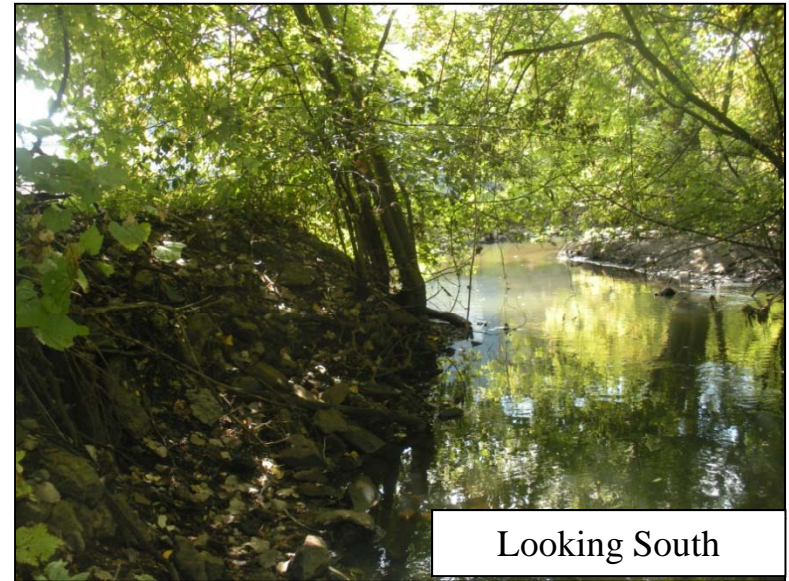


Looking East

Site SA 1-B Photographs



Site SA 1-C Photographs



Site SA 3-A Photographs



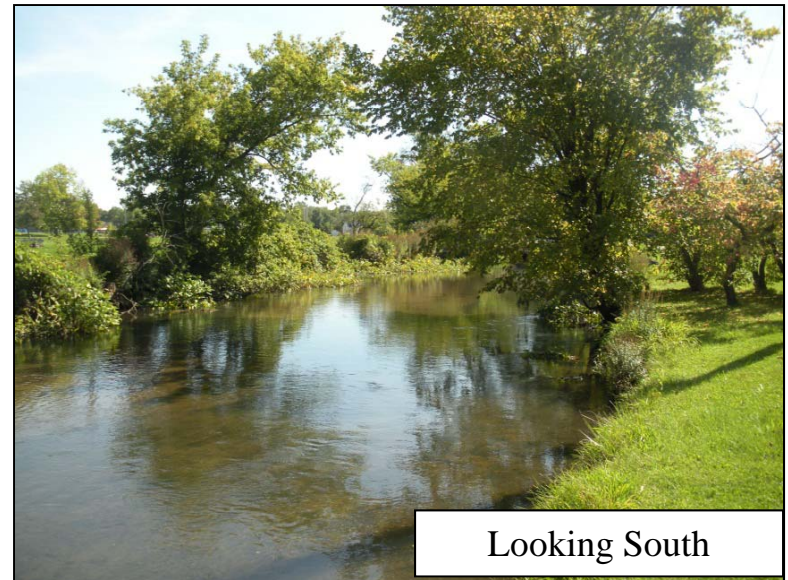
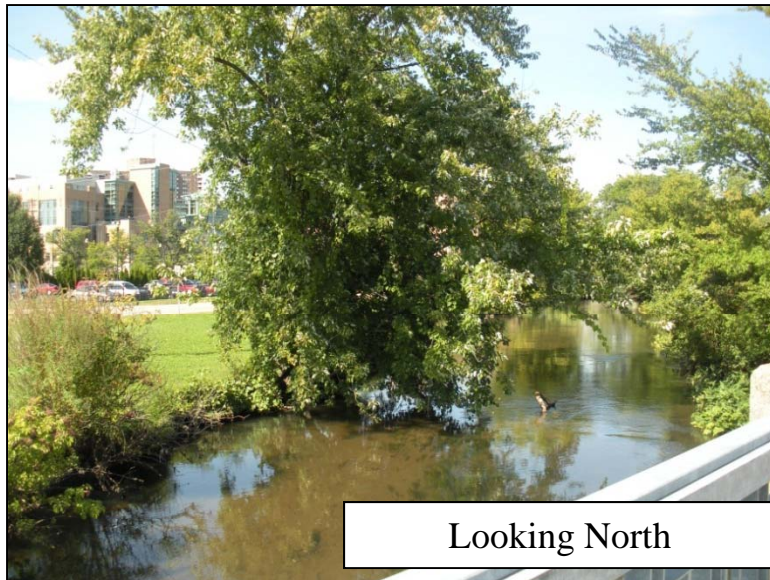
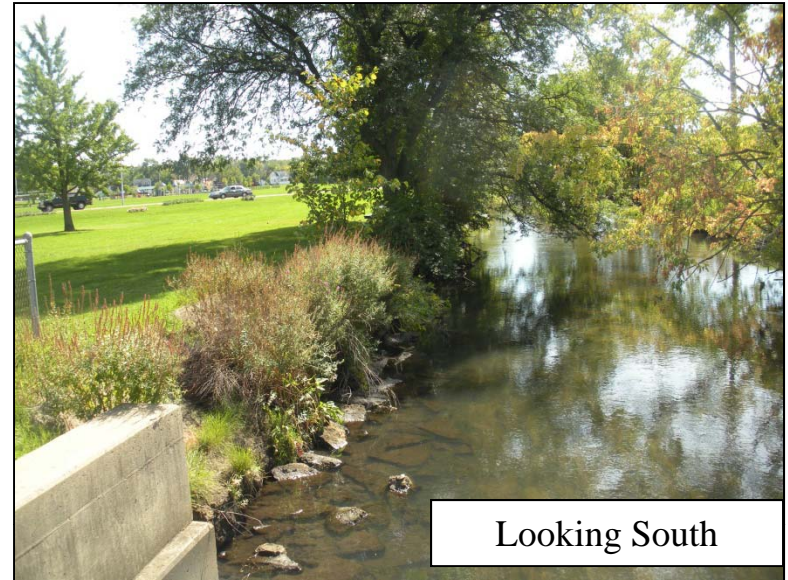
Site SA 5-A Photographs



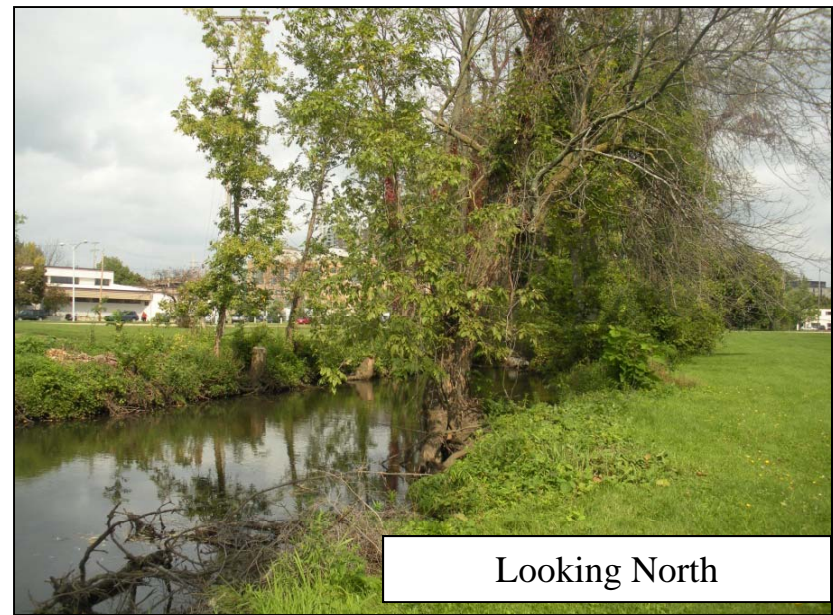
Site SA 5-Axtell Photographs



Site SA 5-C Photographs



Site SA 5-D Photographs



Site SA 6 Photographs



Site SA 7 Photographs (photos provided by EQM)

