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REPORT

2011 PARCEL 22 MONITORING REPORT

BAILEY'S BRANCH AND PLEASANT RUN
REMOVAL ACTION
BEDFORD, INDIANA

Prepared for: General Motors LLC

Conestoga-Rovers & Associates
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Canada

July 2012 • #017368

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LIST OF ACRONYMS AND TERMS

AOC	Administrative Order on Consent
Bailey's Branch Creek	Bailey's Branch Creek at the upstream end of Pleasant Run Watershed
CA	Corrective Action
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CETC	Castings Engines Transmissions and Components (formerly Powertrain)
CRA	Conestoga-Rovers & Associates Inc.
Facility	GM CETC Bedford Facility
GM	General Motors Corporation
IDNR	Indiana Department of Natural Resources
IOMMP	Interim Operation, Maintenance, and Monitoring Plan
RA	Removal Action
Report	2011 Parcel 22 Monitoring Report
RCRA	Resource Conservation and Recovery Act
TSCA	Toxic Substances Control Act
U.S. EPA	United States Environmental Protection Agency

1.0 INTRODUCTION

Conestoga-Rovers and Associates, Inc. (CRA has prepared this 2011 Parcel 22 Monitoring Report (Report)), on behalf of General Motors LLC (GM), documenting the findings of the inspections, conducted during the Summer and Fall of calendar year 2011, on Parcel 22, the restored channel of Bailey's Branch Creek, and adjacent riparian areas located on this parcel, downstream of the GM Castings Engines Transmissions and Components (CETC) Bedford Facility (Facility), located in Bedford, Indiana. This Report was prepared in accordance with the Administrative Order on Consent (AOC, United States Environmental Protection Agency [U.S. EPA] Docket No.: V-W-'03-C-747), effective July 31, 2003, for Removal Action (RA) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and consistent with the requirements of the Toxic Substances Control Act (TSCA) and the Resource Conservation and Recovery Act (RCRA) Corrective Action (CA) work conducted under the Performance Based Agreement executed on March 20, 2001, and modified on October 1, 2002, March 29, 2007, and May 9, 2008, for the Facility.

The inspections were conducted in accordance with the Parcel 22 Interim Operation, Maintenance, and Monitoring Plan (IOMMP) (CRA, May 14, 2010). The Summer 2011 Inspection was conducted on June 23, 2011. The Fall 2011 Inspection was conducted on September 29, 2011. The location of Parcel 22 relative to the GM CETC Bedford Facility is presented on Figure 1.1.

2.0 **BACKGROUND**

The Parcel 22 RA included removal of impacted soil, rock, and sediment from the creek area for off-Site disposal and restoration of the creek and adjacent habitats in the affected areas. The creek channel, riparian corridor, and floodplain were restored to generally similar features using clean soil and aggregate materials. Restoration of the creek channel also included the construction of in-stream features such as pool-riffle sequences and bank stabilization structures. The riparian corridor and floodplain were returned to generally similar conditions and vegetated with a variety of native seed mixes, shrubs and trees (combination of seedlings and specimens with diameters of 1 inch or greater) consistent with the property owners' request. Habitat features, such as deadfalls and vernal ponds were installed within the riparian corridor. Table 2.1 presents a summary of vegetation installed, including the specific seed mixes applied.

3.0 RESTORATION MONITORING

The following sections outline monitoring activities undertaken. The Summer and Fall 2011 Inspections included a field reconnaissance to assess creek channel stability, extent and nature of vegetative cover, and status of the habitat features. A photographic log was used to document conditions along the stream channel. The photographic log and location map for the 2011 Summer and Fall Inspections are provided in Appendices A and B, respectively. The Summer and Fall 2011 vegetative assessments were completed and documented using the monitoring form provided in the Parcel 22 IOMMP (CRA, 2010) and are provided in Appendix C.

3.1 CREEK STABILIZATION

A continuous photographic log was completed, during both the Summer and Fall 2011 Inspections, along the stream channel to document the stability of the stream channel. Minor signs of erosion along the creek banks (e.g., rill erosion, local scour) and floodplain were documented. The presence or lack of installed pool-riffle sequences and waterfalls were also assessed. It should be noted that natural processes are expected to modify the creek through time and the weirs (i.e., rock current deflectors installed to create pool-riffle sequences) placed during restoration are expected to be altered, moved or even removed, once natural processes take over.

In general, the creek channel has not moved or shifted significantly since the restoration activities were completed. As expected, the creek substrate within the creek channel has sorted itself, forming a smaller meandering channel with point bars in the larger overall creek channel. The photographic logs presented in Appendices A and B illustrate the creek substrate at various locations along the creek, consisting of stones of varying sizes.

A number of rock current deflectors that were installed as part of the Parcel 22 RA restoration to promote the formation of pool-riffle sequences within the channel were observed to be largely intact during both 2011 inspections.

The banks along the length of the creek channel did not show a significant amount of erosion, undercutting or failure that was present in the pre-cleanup of the creek. The banks were vegetated during both 2011 inspections.

3.2 VEGETATIVE COVERAGE

Areas adjacent to the restored creek channel (riparian zone) had been re-vegetated after cleanup by applying diverse seed mixes of native grasses and forbs and planting native shrubs and trees to promote succession and re-establish native habitats. Due to the relatively small size of the restored riparian zones, ground truthing during the monitoring events encompassed the entire restored riparian area.

For grasses and forbs, the relative abundance of each species observed was assigned a value between 1 and 6, based on the abundance categories of Simon et al. (2001). Species abundance categories for grasses and forbs are presented in Table 3.1. Each observed species was noted as either included in the specified seed mix or as a volunteer. Species identified by the Indiana Department of Natural Resources (IDNR) as invasive to Southern Indiana were noted (Nice, 2006). The percent aerial cover of grasses and forbs within each cover type was estimated by visual inspection and recorded on the monitoring forms, which are presented in Appendix C

For shrubs and trees, monitoring consisted of identifying species that were present and evaluating survival of seedlings and larger specimens planted within Parcel 22. Survival of shrubs and trees were assigned to one of four survival classes, as defined in Table 3.2. In addition to noting the survival of the specimens planted, shrubs and trees that have colonized each parcel (volunteers), including invasive species, were identified and noted.

In general, the vegetative cover along the riparian corridor is dense, with aerial coverage ranging from 90 to 100 percent. There are no significant signs of erosion requiring maintenance.

In general, grasses observed consisted of those species in seed mixes applied to Parcel 22. The majority of forbs observed were volunteer species. Some invasive species were observed, but overall percentage in terms of both composition and aerial coverage was low. Several of the species of forbs in the planted mix were observed.

Survival of trees and shrubs with diameters ranging from 0.75 to 5 inches that were planted in the area that is lawn, was 51 to 75 percent (Class 3). For the remainder of Parcel 22, survival of trees installed as seedlings is 51 to 75 percent (Class 3). Although several of the larger trees and all of the seedlings have been replaced since the initial plantings, the survival classes are based on the original number of trees specified in the restoration plan for Parcel 22. In addition to the species planted, several of the species observed were volunteers. In addition to the species planted, one of the species observed was a volunteer (Box Elder, *Acer negundo*).

3.3 HABITAT FEATURES

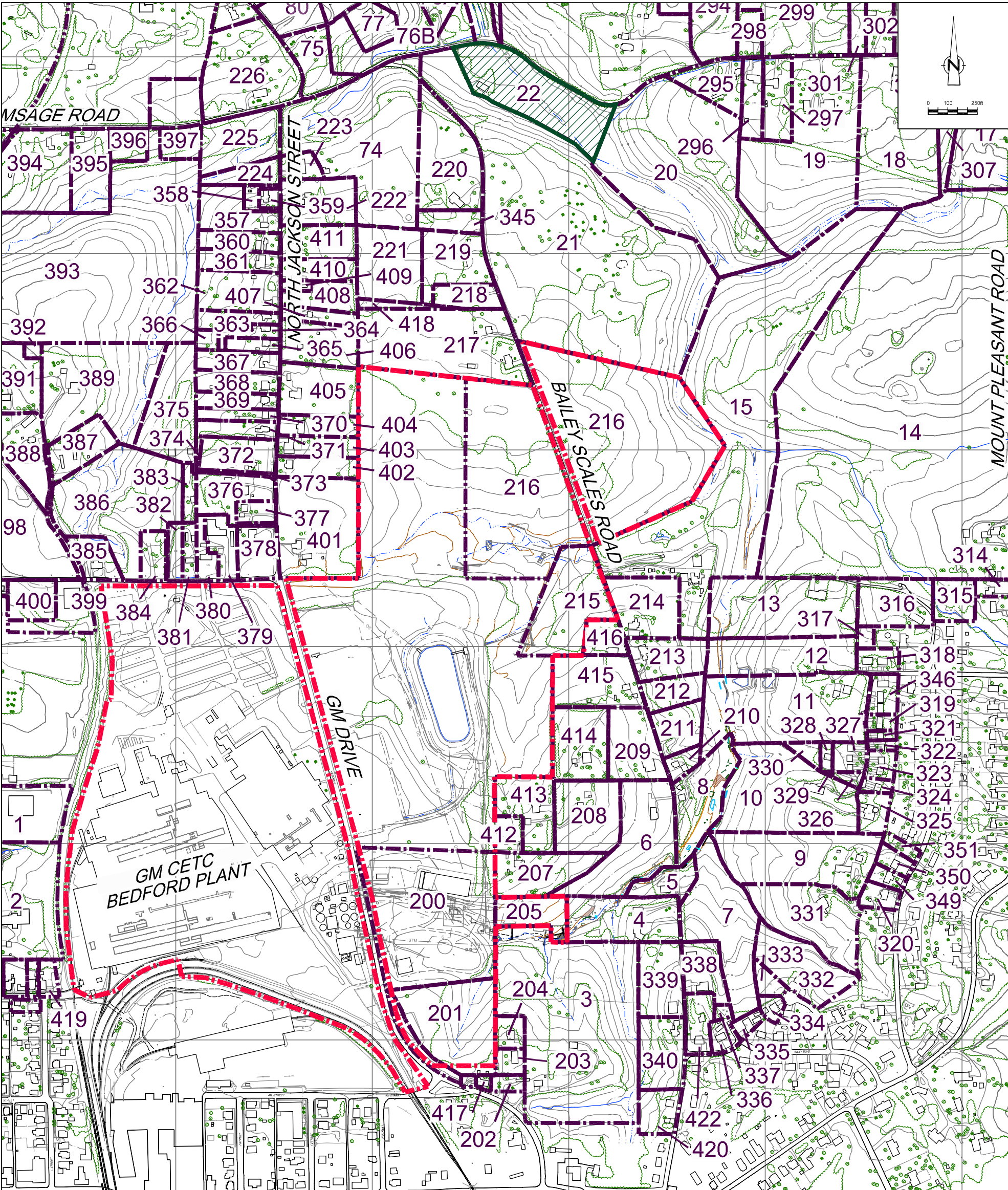
No additional enhanced habitat features other than those originally present in the creek, were incorporated into the Parcel 22 restoration. The habitat features that were installed as part of restoration, appear to be still present (a diversity of substrate sizes that provide high quality habitat for benthic invertebrates, numerous riffle/pool sequences, and meanders within the bed and banks of the restored channel).

4.0 RESTORATION MAINTENANCE

Restoration appears to be thriving on this Parcel and/or have modified through natural processes as envisaged by the restoration plan. No maintenance activities are recommended at this time.

5.0 REFERENCES

- Conestoga-Rovers & Associates, Inc., Parcel 22 Interim Operation, Maintenance, and Monitoring Plan, May 14, 2010.
- Nice, G. 2006. Noxious and invasion weeds and weed laws in Indiana. Purdue Extension Weed Science. Revised 12/06.
- Simon, T.P., Stewart, P.M., and Rothrock, P.E. 2001. Development of multimetric indices of biotic integrity of riverine and palustrine wetland plant communities along Southern Lake Michigan. Aquatic Ecosystem Health and Management 4: 293-309.



LEGEND

- EXISTING GROUND SURFACE ELEVATION CONTOURS (feet AMSL)
- EXISTING VEGETATION
- EXISTING BUILDINGS
- FENCE LINE
- RAILROAD TRACKS
- DIRT ROADS
- ROADS / PAVED AREAS
- APPROXIMATE SURFACE WATER LOCATION
- APPROXIMATE PARCEL BOUNDARY
- APPROXIMATE GM PROPERTY BOUNDARY
- PARCEL 22

NOTE: PROPERTY BOUNDARY LOCATIONS APPROXIMATED FROM THE LAWRENCE COUNTY SURVEY PLATS. LOCATIONS MAY NOT ACCURATELY REPRESENT THE TRUE BOUNDARIES

N2	Revision	Date	Initial

SCALE VERIFICATION	
THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.	
Approved	

GM CETC BEDFORD FACILITY	
2011 PARCEL 22 MONITORING REPORT	
PARCEL 22 LOCATION	

CONESTOGA-ROVERS & ASSOCIATES			
Source References: BASE MAP COMPLETED BY AIR-LAND SURVEYS, FLINT, MI APRIL 2001 AND GRA SURVEYS 2002 TO 2005			
Project Manager: JAL	Reviewed By: P.G.	Date: JANUARY 2011	
Scale: AS SHOWN	Project N#: 17368-20	Report N#: 006	Drawing N#: figure 1.1

TABLE 2.1

**TREE/VEGETATION SUMMARY
2011 PARCEL 22 MONITORING REPORT
GMCETC BEDFORD FACILITY
BEDFORD, INDIANA**

	<i>Number of trees/seedlings and shrubs installed</i>	<i>Other</i>
Parcel 22	66	grass/wildflower seed mix, slope forest seed mix, lawn seed mix and sod

TABLE 3.1

SPECIES ABUNDANCE CATEGORIES FOR GRASSES AND FORBS
 2011 PARCEL 22 MONITORING REPORT
 GM CETC BEDFORD FACILITY
 BEDFORD, INDIANA

<i>Abundance Rating</i>	<i>Abundance Category</i>	<i>Description</i>
1	Observed	1 individual of a species present
2	Rare	2-4 individuals of a species present
3	Rare/Common	>4 individuals of a species, but not enough to be categorized as "common"
4	Common	Species is easily located
5	Very Common	Species is slightly dominant; up to 25% of the plant community
6	Abundant	Species accounts for 25-100% of the plant community

Source: Simon et al., 2001

TABLE 3.2

**SURVIVAL CLASSES FOR TREES AND SHRUBS
2011 PARCEL 22 MONITORING REPORT
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA**

<i>Survival Class</i>	<i>Range of Percent Survival</i>
1	0 – 25%
2	26 – 50%
3	51 – 75%
4	76 – 100%

APPENDIX A

SUMMER 2011 PARCEL 22 PHOTO LOG

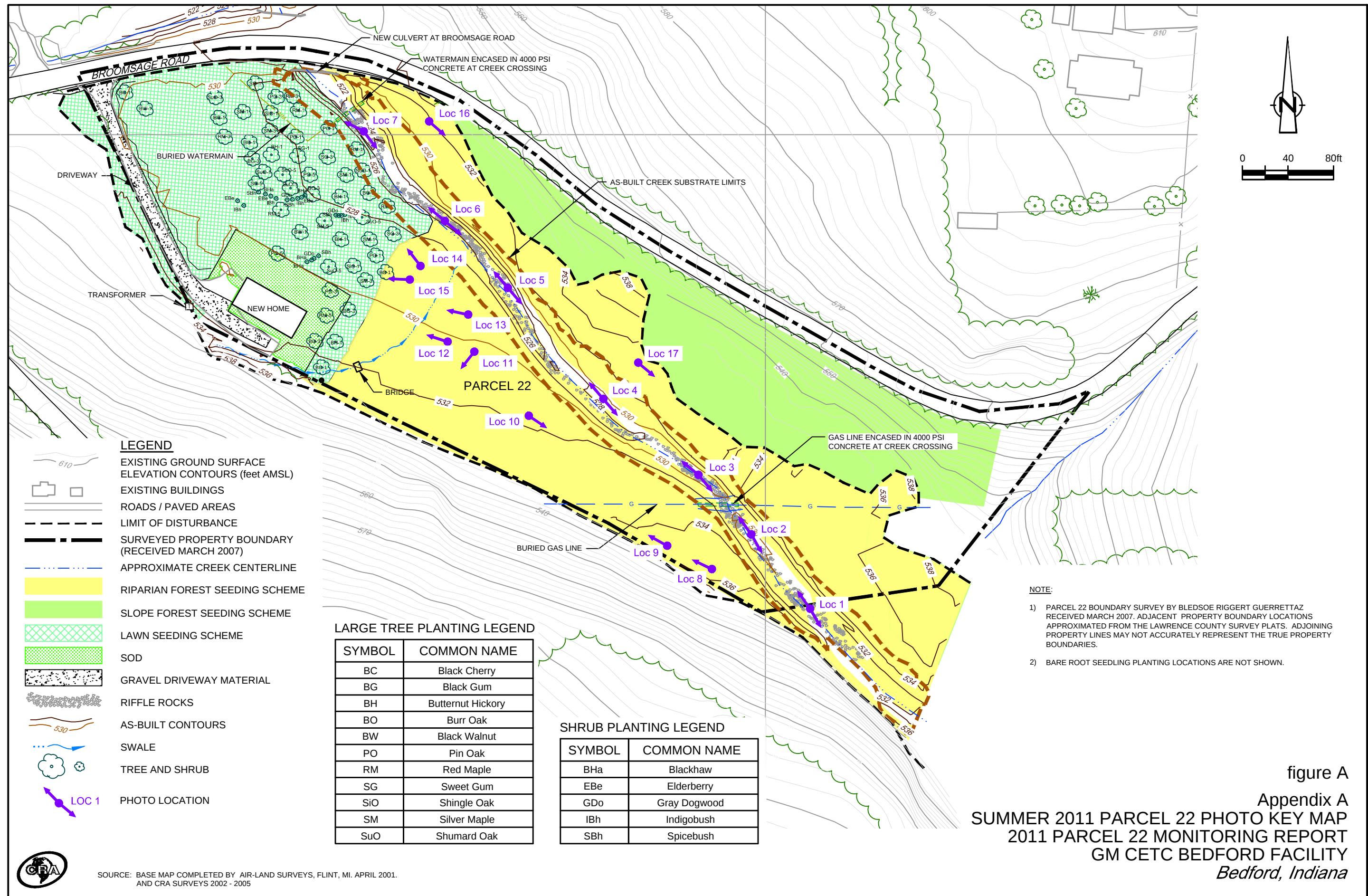




PHOTO 1: LOCATION 1 - LOOKING SOUTHEAST (UPSTREAM)



PHOTO 2: LOCATION 1 - LOOKING NORTHWEST (DOWNSTREAM)

Appendix A

SUMMER 2011 PARCEL 22 PHOTO LOG
 2011 PARCEL 22 MONITORING REPORT
 GM CETC BEDFORD FACILITY
Bedford, Indiana





PHOTO 3: LOCATION 2 - LOOKING SOUTHEAST (UPSTREAM)

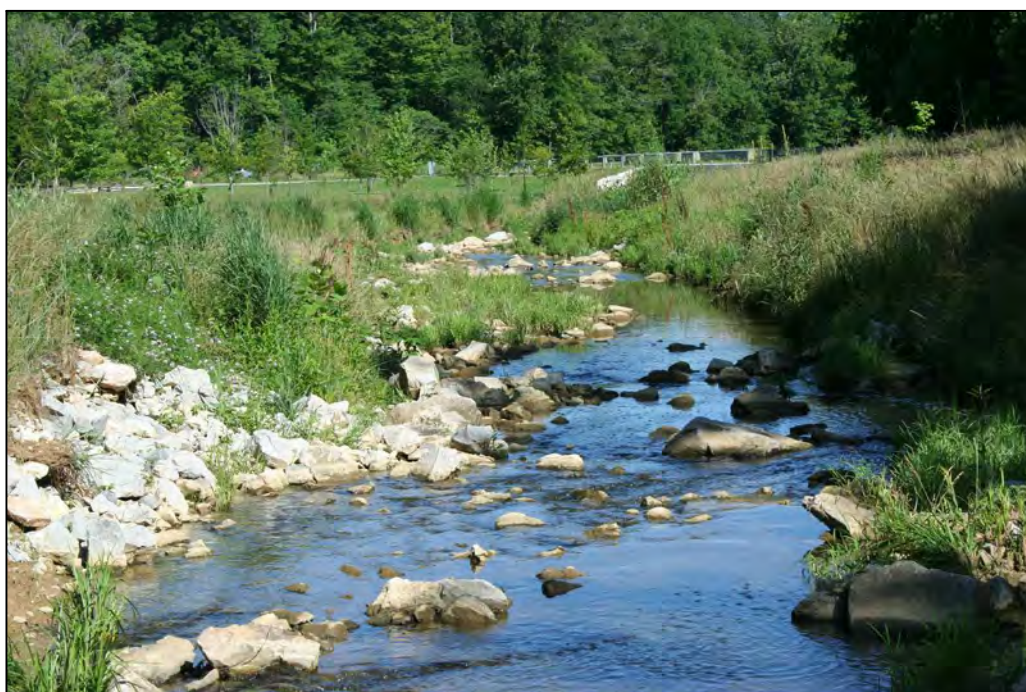


PHOTO 4: LOCATION 2 - LOOKING NORTHWEST (DOWNSTREAM)

Appendix A

SUMMER 2011 PARCEL 22 PHOTO LOG 2011 PARCEL 22 MONITORING REPORT GM CETC BEDFORD FACILITY *Bedford, Indiana*





PHOTO 5: LOCATION 3 - LOOKING SOUTHEAST (UPSTREAM)



PHOTO 6: LOCATION 3 - LOOKING NORTHWEST (DOWNSTREAM)

Appendix A

SUMMER 2011 PARCEL 22 PHOTO LOG
2011 PARCEL 22 MONITORING REPORT
GM CETC BEDFORD FACILITY
Bedford, Indiana





PHOTO 7: LOCATION 4 - LOOKING SOUTHEAST (UPSTREAM)



PHOTO 8: LOCATION 4 - LOOKING NORTHWEST (DOWNSTREAM)

Appendix A

SUMMER 2011 PARCEL 22 PHOTO LOG
 2011 PARCEL 22 MONITORING REPORT
 GM CETC BEDFORD FACILITY
Bedford, Indiana





PHOTO 9: LOCATION 5 - LOOKING SOUTHEAST (UPSTREAM)



PHOTO 10: LOCATION 5 - LOOKING NORTHWEST (DOWNSTREAM)

Appendix A

SUMMER 2011 PARCEL 22 PHOTO LOG 2011 PARCEL 22 MONITORING REPORT GM CETC BEDFORD FACILITY *Bedford, Indiana*





PHOTO 11: LOCATION 6 - LOOKING SOUTHEAST (UPSTREAM)



PHOTO 12: LOCATION 6 - LOOKING NORTHWEST (DOWNSTREAM)

Appendix A

SUMMER 2011 PARCEL 22 PHOTO LOG
 2011 PARCEL 22 MONITORING REPORT
 GM CETC BEDFORD FACILITY
Bedford, Indiana





PHOTO 13: LOCATION 7 - LOOKING SOUTHEAST (UPSTREAM)



PHOTO 14: LOCATION 7 - LOOKING NORTHWEST (DOWNSTREAM)

Appendix A

SUMMER 2011 PARCEL 22 PHOTO LOG
 2011 PARCEL 22 MONITORING REPORT
 GM CETC BEDFORD FACILITY
Bedford, Indiana





PHOTO 15: LOCATION 7 - LOOKING NORTHWEST



PHOTO 16: LOCATION 8 - LOOKING NORTHWEST

Appendix A

SUMMER 2011 PARCEL 22 PHOTO LOG 2011 PARCEL 22 MONITORING REPORT GM CETC BEDFORD FACILITY *Bedford, Indiana*





PHOTO 17: LOCATION 9 - LOOKING NORTHWEST



PHOTO 18: LOCATION 10 - LOOKING SOUTHEAST

Appendix A

SUMMER 2011 PARCEL 22 PHOTO LOG 2011 PARCEL 22 MONITORING REPORT GM CETC BEDFORD FACILITY *Bedford, Indiana*





PHOTO 19: LOCATION 11 - LOOKING SOUTHWEST



PHOTO 20: LOCATION 12 - LOOKING NORTHWEST

Appendix A

SUMMER 2011 PARCEL 22 PHOTO LOG
 2011 PARCEL 22 MONITORING REPORT
 GM CETC BEDFORD FACILITY
Bedford, Indiana





PHOTO 21: LOCATION 13 - LOOKING NORTHWEST



PHOTO 22: LOCATION 14 - LOOKING NORTHWEST

Appendix A

SUMMER 2011 PARCEL 22 PHOTO LOG
2011 PARCEL 22 MONITORING REPORT
GM CETC BEDFORD FACILITY
Bedford, Indiana





PHOTO 23: LOCATION 15 - LOOKING WEST



PHOTO 24: LOCATION 16 - LOOKING SOUTHEAST

Appendix A

SUMMER 2011 PARCEL 22 PHOTO LOG
 2011 PARCEL 22 MONITORING REPORT
 GM CETC BEDFORD FACILITY
Bedford, Indiana





PHOTO 25: LOCATION 17 - LOOKING SOUTHEAST

Appendix A

SUMMER 2011 PARCEL 22 PHOTO LOG 2011 PARCEL 22 MONITORING REPORT GM CETC BEDFORD FACILITY *Bedford, Indiana*



APPENDIX B

FALL 2011 PARCEL 22 PHOTO LOG

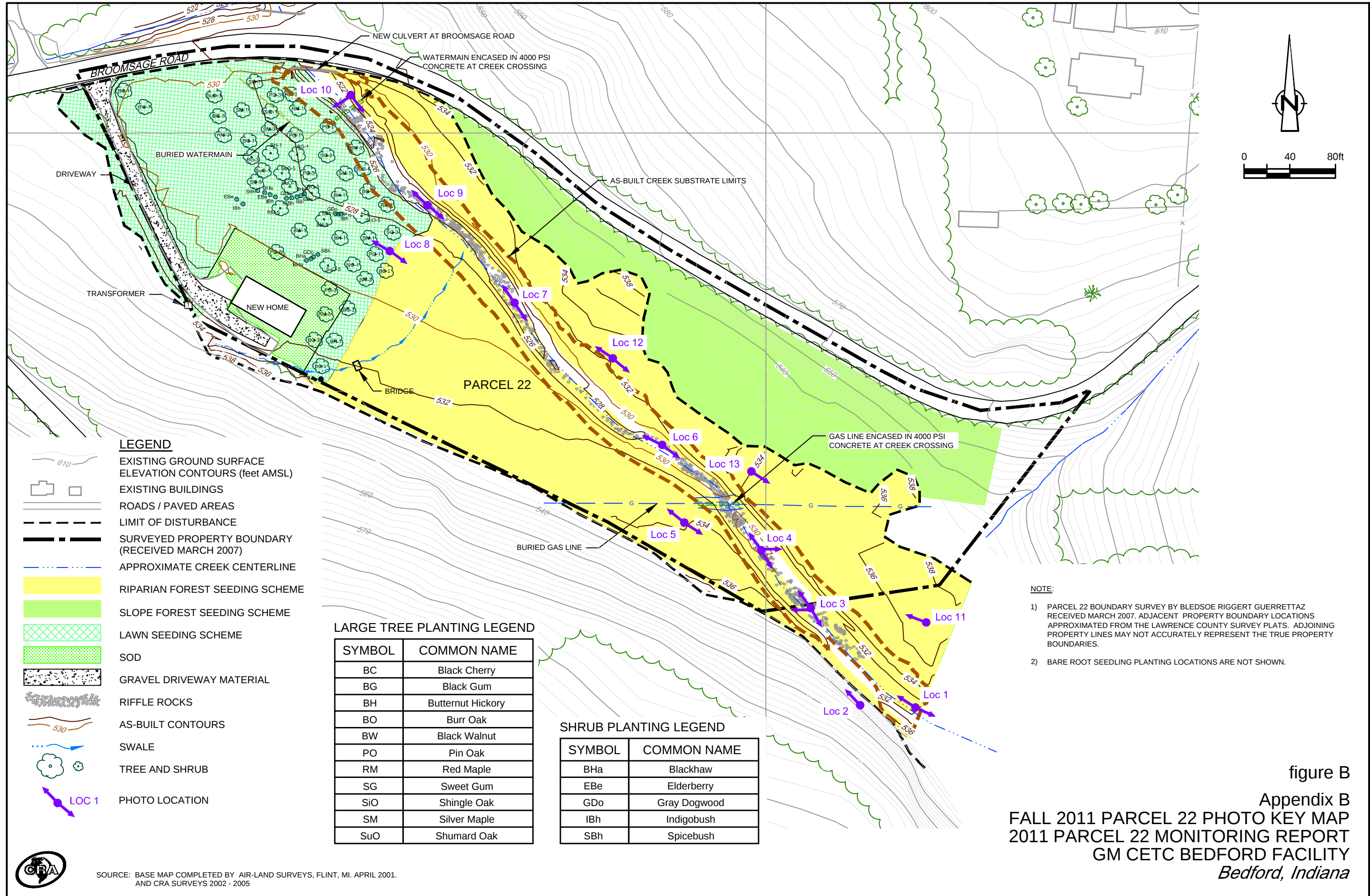


figure B
Appendix B
FALL 2011 PARCEL 22 PHOTO KEY MAP
2011 PARCEL 22 MONITORING REPORT
GM CETC BEDFORD FACILITY
Bedford, Indiana



PHOTO 1: LOCATION 1 - LOOKING SOUTHEAST (UPSTREAM)

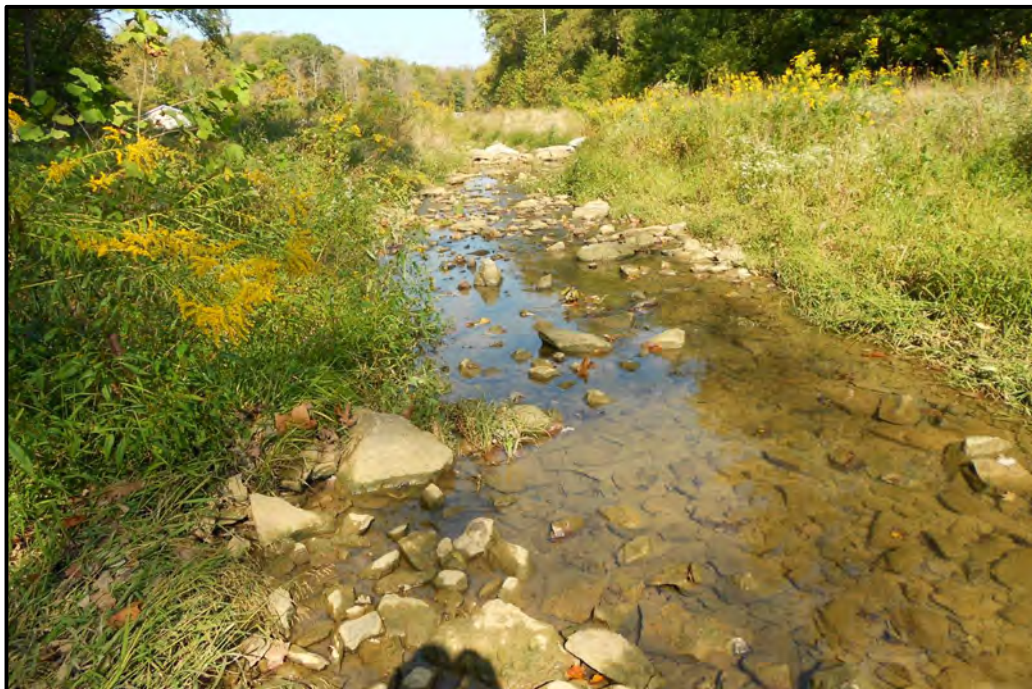


PHOTO 2: LOCATION 1 - LOOKING NORTHWEST (DOWNSTREAM)

Appendix B

FALL 2011 PARCEL 22 PHOTO LOG
 2011 PARCEL 22 MONITORING REPORT
 GM CETC BEDFORD FACILITY
Bedford, Indiana





PHOTO 3: LOCATION 2 - LOOKING NORTHWEST



PHOTO 4: LOCATION 3 - LOOKING SOUTHEAST (UPSTREAM)

Appendix B

FALL 2011 PARCEL 22 PHOTO LOG
2011 PARCEL 22 MONITORING REPORT
GM CETC BEDFORD FACILITY
Bedford, Indiana





PHOTO 5: LOCATION 3 - LOOKING NORTHWEST DOWNSTREAM)



PHOTO 6: LOCATION 3 - LOOKING WEST (SOUTH BANK)

Appendix B

FALL 2011 PARCEL 22 PHOTO LOG 2011 PARCEL 22 MONITORING REPORT GM CETC BEDFORD FACILITY *Bedford, Indiana*





PHOTO 7: LOCATION 4 - LOOKING SOUTHEAST (UPSTREAM)



PHOTO 8: LOCATION 4 - LOOKING NORTHWEST (DOWNSTREAM)

Appendix B

FALL 2011 PARCEL 22 PHOTO LOG
 2011 PARCEL 22 MONITORING REPORT
 GM CETC BEDFORD FACILITY
Bedford, Indiana





PHOTO 9: LOCATION 4 - LOOKING EAST (NORTH BANK)



PHOTO 10: LOCATION 5 - LOOKING SOUTHEAST

Appendix B

FALL 2011 PARCEL 22 PHOTO LOG
2011 PARCEL 22 MONITORING REPORT
GM CETC BEDFORD FACILITY
Bedford, Indiana





PHOTO 11: LOCATION 6 - LOOKING NORTHWEST



PHOTO 12: LOCATION 6 - LOOKING NORTHEAST (UPSTREAM)

Appendix B

FALL 2011 PARCEL 22 PHOTO LOG
 2011 PARCEL 22 MONITORING REPORT
 GM CETC BEDFORD FACILITY
Bedford, Indiana





PHOTO 13: LOCATION 6 - LOOKING NORTHWEST (DOWNSTREAM)



PHOTO 14: LOCATION 7 - LOOKING SOUTHEAST (CHANNEL BRAID UPSTREAM)

Appendix B

FALL 2011 PARCEL 22 PHOTO LOG
 2011 PARCEL 22 MONITORING REPORT
 GM CETC BEDFORD FACILITY
Bedford, Indiana





PHOTO 15: LOCATION 7 - LOOKING NORTHWEST (DOWNSTREAM)



PHOTO 16: LOCATION 8 - LOOKING SOUTHEAST

Appendix B

FALL 2011 PARCEL 22 PHOTO LOG
 2011 PARCEL 22 MONITORING REPORT
 GM CETC BEDFORD FACILITY
Bedford, Indiana





PHOTO 17: LOCATION 8 - LOOKING NORTHWEST

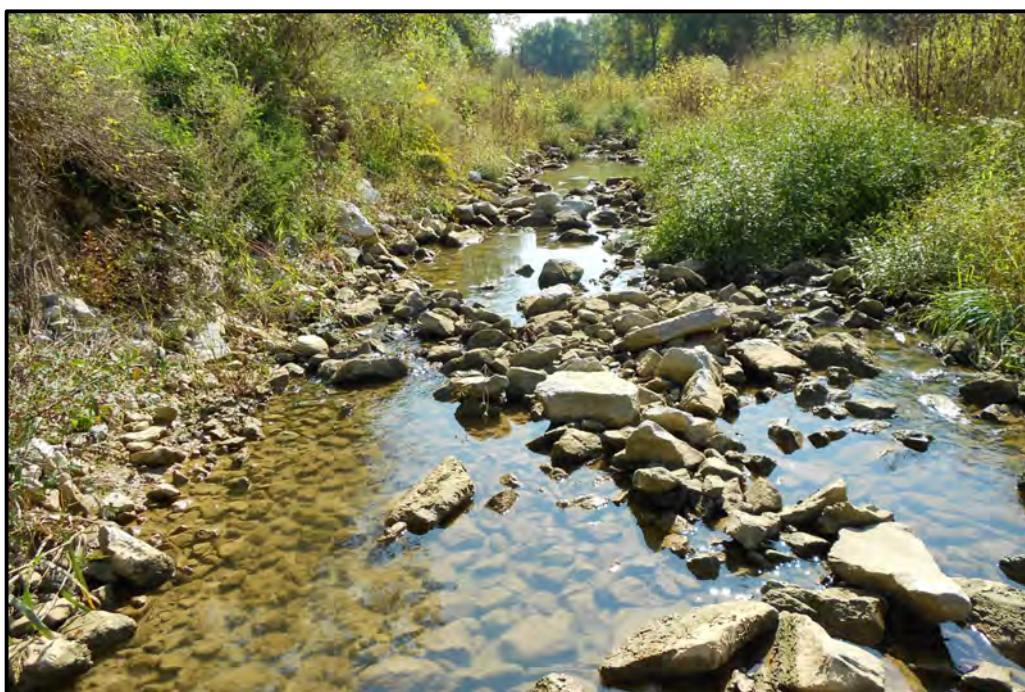


PHOTO 18: LOCATION 9 - LOOKING SOUTHEAST (UPSTREAM)

Appendix B

FALL 2011 PARCEL 22 PHOTO LOG 2011 PARCEL 22 MONITORING REPORT GM CETC BEDFORD FACILITY *Bedford, Indiana*





PHOTO 19: LOCATION 9 - LOOKING NORTHWEST (DOWNSTREAM)



PHOTO 20: LOCATION 10 - LOOKING SOUTHEAST (UPSTREAM)

Appendix B

FALL 2011 PARCEL 22 PHOTO LOG 2011 PARCEL 22 MONITORING REPORT GM CETC BEDFORD FACILITY *Bedford, Indiana*





PHOTO 21: LOCATION 10 - LOOKING SOUTHWEST (SOUTH BANK)



PHOTO 22: LOCATION 11 - LOOKING NORTHWEST

Appendix B

FALL 2011 PARCEL 22 PHOTO LOG
 2011 PARCEL 22 MONITORING REPORT
 GM CETC BEDFORD FACILITY
Bedford, Indiana





PHOTO 23: LOCATION 12 - LOOKING SOUTHEAST



PHOTO 24: LOCATION 12 - LOOKING NORTHWEST

Appendix B

FALL 2011 PARCEL 22 PHOTO LOG 2011 PARCEL 22 MONITORING REPORT GM CETC BEDFORD FACILITY *Bedford, Indiana*





PHOTO 25: LOCATION 13 - LOOKING SOUTHEAST



Appendix B
FALL 2011 PARCEL 22 PHOTO LOG
2011 PARCEL 22 MONITORING REPORT
GM CETC BEDFORD FACILITY
Bedford, Indiana

APPENDIX C

SUMMER AND FALL 2011 VEGETATIVE ASSESSMENT FIELD FORMS

VEGETATION MONITORING FORM
PARCEL 22 IOMMP
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Inspector(s)	S. Jones
Date	June 23, 2011
Parcels/Cover Type	Parcel 22/Grass-Forb Cover

I. GRASSES AND FORBS

Common Name	Scientific Name	Abundance		Seeded		Volunteer		Invasive	
		Rating	Category	Yes	No	Yes	No	Yes	No
Switchgrass	<i>Panicum virgatum</i>	3	Rare/Common	X			X		X
Redtop	<i>Agrostis sp.</i>	4	Common	X			X		X
Foxtail	<i>Alopecurus sp.</i>	5	Very Common		X	X			X
Fescue	<i>Festuca sp.</i>	3	Rare/Common		X	X			X
Bluejoint Grass	<i>Calamagrostis canadensis</i>	3	Rare/Common	X			X		X
Bird's-Foot Trefoil	<i>Lotus unifoliolatus</i>	2	Rare		X	X			X
Daisy Fleabane	<i>Erigeron annuus</i>	3	Rare/Common	X			X		X
Great Ragweed	<i>Ambrosia trifida</i>	5	Very Common		X	X			X
Queen Anne's Lace	<i>Daucus carota</i>	2	Rare		X	X			X
Sweetclover	<i>Melilotus officinalis</i>	4	Common		X	X		X	
Ragweed	<i>Ambrosia artemisiifolia</i>	5	Very Common		X	X			X
Lurid Sedg	<i>Carex lurida</i>	2	Rare		X	X			X

**VEGETATION MONITORING FORM
PARCEL 22 IOMMP
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA**

I. GRASSES AND FORBS (continued)

Common Name	Scientific Name	Abundance		Seeded		Volunteer		Invasive	
		Rating	Category	Yes	No	Yes	No	Yes	No
Prairie Dock	<i>Silphium terebinthinaceum</i>	2	Rare	X			X		X
Virginia Creeper	<i>Parthenocissus quinquefolia</i>	3	Rare/Common		X	X			X
Vetch	<i>Vicia sp.</i>	4	Common		X	X			X
Compass Plant	<i>Silphium laciniatum</i>	1	Observed	X			X		X
Aster	<i>Aster sp.</i>	3	Rare/Common	X			X		X
Canada Goldenrod	<i>Solidago canadensis</i>	3	Rare/Common		X	X			X
Common Plantain	<i>Plantago major</i>	2	Rare		X	X			X
Partridge Pea	<i>Chamaecrista fasciculata</i>	2	Rare	X			X		X
Canada Thistle	<i>Cirsium arvense</i>	3	Rare/Common		X	X		X	
Common Dandelion	<i>Taxacum officinale</i>	1	Observed		X	X			X
Peppermint	<i>Mentha sp.</i>	3	Rare/Common		X	X			X
Teasel	<i>Dipsacus sp.</i>	3	Rare/Common		X	X		X	
Common Mullein	<i>Verbascum thapsus</i>	2	Rare		X	X			X
Sedge	<i>Carex sp.</i>	2	Rare		X	X			X
Sowthistle	<i>Sonchus sp.</i>	3	Rare/Common		X	X			X

Percent Areal Coverage of Grasses and Forbs

> 90%

VEGETATION MONITORING FORM
PARCEL 22 IOMMP
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

II. SHRUBS AND TREES

Common Name	Scientific Name	Planted		Volunteer		Invasive	
		Yes	No	Yes	No	Yes	No
Red Maple	<i>Acer rubrum</i>	X			X		X
Bur Oak	<i>Quercus macrocarpa</i>	X			X		X
Sycamore	<i>Platanus occidentalis</i>	X			X		X
Box Elder	<i>Acer negundo</i>		X	X			X
Black Gum	<i>Nyssa sylvatica</i>	X			X		X
Sweet Gum	<i>Liquidambar styraciflua</i>	X			X		X
Shumard Oak	<i>Quercus shumardii</i>	X			X		X
Hickory	<i>Carya sp.</i>	X			X		X
Silver Maple	<i>Acer saccharinum</i>	X			X		X

Survival Class
(Shrubs and Trees)

≤ 25%

26-50%

51-75%

> 75%

III. WILDLIFE OBSERVED

Numerous songbirds observed in area during monitoring

IV. NOTES

¹ - Invasive species based on: Nice, G. 2006. Noxious and Invasive Weeds and the Weed Laws in Indiana. Purdue Extension Weed Science. Revised 12/06

VEGETATION MONITORING FORM
PARCEL 22 IOMMP
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Inspector(s)	S. Jones
Date	September 29, 2011
Parcels/Cover Type	Parcel 22/Grass-Forb Cover

I. GRASSES AND FORBS

Common Name	Scientific Name	Abundance		Seeded		Volunteer		Invasive	
		Rating	Category	Yes	No	Yes	No	Yes	No
Switchgrass	<i>Panicum virgatum</i>	4	Rare/Common	X			X		X
Indiangrass	<i>Sorghastrum nutans</i>	2	Rare	X			X		X
Redtop	<i>Agrostis sp.</i>	4	Common	X			X		X
Foxtail	<i>Alopecurus sp.</i>	4	Common		X	X			X
Fescue	<i>Festuca sp.</i>	4	Common		X	X			X
Goosegrass	<i>Eleusine indica</i>	1	Observed		X	X			X
Johnsongrass	<i>Sorghum halepense</i>	3	Rare/Common		X	X			X
Bluejoint Grass	<i>Calamagrostis canadensis</i>	3	Rare/Common	X			X		X
Unidentified Grass	Gramineae	5	Very Common		X	X			X
Ragweed	<i>Ambrosia artemisiifolia</i>	5	Very Common		X	X			X
Lurid Sedg	<i>Carex lurida</i>	2	Rare		X	X			X
Canada Thistle	<i>Cirsium arvense</i>	3	Rare/Common		X	X		X	

**VEGETATION MONITORING FORM
PARCEL 22 IOMMP
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA**

I. GRASSES AND FORBS (continued)

Common Name	Scientific Name	Abundance		Seeded		Volunteer		Invasive	
		Rating	Category	Yes	No	Yes	No	Yes	No
Great Ragweed	<i>Ambrosia trifida</i>	3	Rare/Common		X	X			X
Prairie Dock	<i>Silphium terebinthinaceum</i>	2	Rare	X			X		X
Mistflower	<i>Conoclinium coelestinum</i>	2	Rare	X			X		X
White Snakeroot	<i>Ageratina altissima</i>	3	Rare/Common		X	X			X
Small White Aster	<i>Symphyotrichum racemosum</i>	4	Common		X	X			X
Queen Anne's Lace	<i>Daucus carota</i>	3	Rare/Common		X	X			X
Cocklebur	<i>Xanthium sp.</i>	2	Rare		X	X		X	
Swamp Smartweed	<i>Polygonum coccineum</i>	5	Very Common		X	X			X
Tickseed Sunflower	<i>Bidens aritosa</i>	5	Very Common	X			X		X
Virginia Creeper	<i>Parthenocissus quinquefolia</i>	4	Common		X	X			X
Canada Goldenrod	<i>Solidago canadensis</i>	4	Common		X	X			X
Jewelweed	<i>Impatiens capensis</i>	2	Rare		X	X			X
Indiana Tobacco	<i>Nicotiana quadrivalis</i>	3	Rare/Common		X	X			X
Teasel	<i>Dipsacus sp.</i>	3	Rare/Common		X	X		X	
Common Mullein	<i>Verbascum thapsus</i>	2	Rare		X	X			X
Blackeyed Susan	<i>Rudbeckia hirta</i>	5	Very Common	X			X		X
Vetch	<i>Vicia sp.</i>	3	Rare/Common		X	X			X

VEGETATION MONITORING FORM
 PARCEL 22 IOMMP
 GM CETC BEDFORD FACILITY
 BEDFORD, INDIANA

I. GRASSES AND FORBS (continued)

Common Name	Scientific Name	Abundance		Seeded		Volunteer		Invasive	
		Rating	Category	Yes	No	Yes	No	Yes	No
Yellow Woodsorrel	<i>Oxalis sp.</i>	2	Rare		X	X			X
Common Dandelion	<i>Taxacum officinale</i>	3	Rare/Common		X	X			X
Chicory	<i>Cochorium sp.</i>	3	Rare/Common		X	X			X
Moneywort	<i>Alysicarpus sp.</i>	3	Rare/Common		X	X			X
Red Clover	<i>Trifolium pratense</i>	3	Rare/Common		X	X			X

Percent Areal Coverage of Grasses and Forbs

> 90%

**VEGETATION MONITORING FORM
PARCEL 22 IOMMP
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA**

II. SHRUBS AND TREES

Common Name	Scientific Name	Planted		Volunteer		Invasive	
		Yes	No	Yes	No	Yes	No
Red Maple	<i>Acer rubrum</i>	X			X		X
Bur Oak	<i>Quercus macrocarpa</i>	X			X		X
Sycamore	<i>Platanus occidentalis</i>	X			X		X
Box Elder	<i>Acer negundo</i>		X	X			X
Black Gum	<i>Nyssa sylvatica</i>	X			X		X
Sweet Gum	<i>Liquidambar styraciflua</i>	X			X		X
Shumard Oak	<i>Quercus shumardii</i>	X			X		X
Hickory	<i>Carya sp.</i>	X			X		X
Silver Maple	<i>Acer saccharinum</i>	X			X		X

**Survival Class
(Shrubs and Trees)**

≤ 25%

26-50%

51-75%

> 75%

III. WILDLIFE OBSERVED

Numerous songbirds (e.g., cardinal) and crows observed in area during monitoring

IV. NOTES

¹ - Invasive species based on: Nice, G. 2006. Noxious and Invasive Weeds and the Weed Laws in Indiana. Purdue Extension Weed Science. Revised 12/06