



INTERIM OPERATION, MAINTENANCE, AND MONITORING PLAN

PARCEL 22

GM CTEC FACILITY BEDFORD, INDIANA

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LIST OF ACRONYMS AND TERMS

Agreement	Performance-Based Corrective Action Agreement
AOC	Administrative Order on Consent
CA	Corrective Action
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CRA	Conestoga-Rovers & Associates Inc.
Facility	GM CTEC Bedford Facility
GM	General Motors LLC
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
IM	Interim Measure
IOMMP	Interim Operation, Maintenance, and Monitoring Plan
OMMP	Operation, Maintenance, and Monitoring Plan
RA	Removal Action
RCRA	Resource Conservation and Recovery Act
Site	Parcel 22
SSC	Site Source Control
U.S. EPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
Work Plan	Parcel 22 Removal Action Work Plan

1.0 INTRODUCTION

This Interim Operation, Maintenance, and Monitoring Plan (IOMMP) for the Parcel 22 Removal Action (RA) conducted near the General Motors LLC (GM) CTEC Bedford Facility (Facility) located in Bedford, Indiana has been prepared by Conestoga-Rovers & Associates, Inc. (CRA), on behalf of GM, and is submitted in accordance with the Administrative Order On Consent (AOC) For RA Proceeding Under Sections 104, 106(a), 107, and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. SS 9604, 9606(a), 9607, and 9622 [United States Environmental Protection Agency (U.S. EPA) Docket No.: V-W-'03-C-747] effective July 31, 2003 (Order), and the Resource Conservation and Recovery Act (RCRA) Corrective Action (CA) activities being conducted under the Performance-Based CA Agreement (Agreement) (effective March 20, 2001, as amended on October 1, 2002, March 29, 2007, and May 9, 2008) for the Facility.

This IOMMP for Parcel 22 presents the procedures and protocols to conduct routine monitoring and maintenance activities. The location of Parcel 22 (Site) is presented on Figure 1.1.

2.0 AS-RECORDED

The RA for Parcel 22 included removal and transportation of impacted soil, sediment and bedrock above the project cleanup criteria but less than 50 milligrams per kilogram (mg/kg) (<50 mg/kg) polychlorinated biphenyl (PCB) to on-Site staging facilities in the East Plant Area for use as grading fill, transportation and off-Site disposal of greater than or equal to 50 mg/kg (≥ 50 mg/kg) PCB soil and other materials at approved permitted landfill facilities, installation of a new culvert/bridge at Broomsage Road, and restoration of the disturbed areas of the property. The RA is described more fully in the Construction Certification Report for Parcel 22. Other aspects of the RA related to Parcel 22, such as the Site Source Controls (SSC) Work Plan, will be incorporated into a separate document. The restoration of Parcel 22 was substantially completed in 2009. Recent work on Parcel 22 (e.g., septic system installation, trailer placement, and installation of a permanent swale circumventing the trailer) required portions of the lawn to be re-graded and re-seeded in the Spring of 2010. Figure 2.1 presents as-recorded features of the restoration of Parcel 22.

Restoration features of Parcel 22 include riparian, slope-forest and lawn seed mixes applied, habitat features installed (e.g., riffle rocks), shrub and tree plantings, construction of the Parcel 22 driveway, and installation of a footbridge over a small swale in the yard. Table 2.1 presents a summary of vegetation installed on Parcel 22, including the specific seed mixes applied.

3.0 RESTORATION MONITORING

The following sections outline monitoring guidelines for completing the IOMMP. Monitoring will be conducted twice annually for a period of two years. The first monitoring event will be conducted in May/June 2010. The Parcel 22 property owners will be given 48 hours notice in advance prior to accessing the parcel for the purpose of restoration monitoring. Appendix A presents an example of the monitoring inspection form.

3.1 CREEK STABILIZATION

Stream stabilization is an important indicator of the success of the restoration. A walkthrough will be performed to visually inspect stability of the creek channel and banks along the length of Parcel 22. It should be noted that natural processes are expected to modify the creek through time. Inspectors will look for signs of excessive erosion on creek banks which may indicate fundamental instability (e.g., large areas of collapsed creek banks, under-cutting of the culvert structure supports). The natural re-configuration of the constructed riffle/pool sequences will be described. It should also be noted that Parcel 22 is private property and GM does not have control over the current or future use of the parcel whose owners may modify the property and creek through time. Signs of significant de-stabilization will be documented photographically.

3.2 VEGETATIVE COVERAGE

Areas adjacent to the restored creek channel (riparian zone) on the upstream portions of the Parcel were re-vegetated by riparian forest and slope forest seed mixes. A lawn seed mix was used on those portions of Parcel 22 in front of (east of) the house which were identified by the Parcel owner as the yard area. Sod was installed in a portion of the yard surrounding the home. In addition, native shrubs and trees, as described in the Construction Certification Report for Parcel 22, were planted in a way such that succession to re-establish native habitats was promoted. The approach for monitoring re-vegetation of the riparian zone is qualitative. This qualitative approach consists of ground truthing the restored riparian zone on Parcel 22 for each cover type (e.g., floodplain forest, slope forest) and identifying the vegetation present.

For grasses, the relative abundance of each species observed will be assigned a value between 1 and 6 based on the abundance categories of Simon et al. (2001). Table 3.1 identifies and defines the abundance categories described by Simon et al. (2001). Each

species observed will be noted as either included in the specified seed mix or as a volunteer. Species identified by IDNR as invasive to southern Indiana will be noted. The percent aerial cover of grasses within each cover type will be estimated by visual inspection and recorded on the monitoring form.

For shrubs and trees, monitoring will consist of identifying species present and evaluating survival of seedlings and larger specimens planted in Parcel 22. Survival of shrubs and trees will be 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 (volunteers), including invasive species, will be identified and noted.

3.4 MONITORING FREQUENCY

Monitoring of the Parcel 22 creek stability, vegetative coverage, and habitat features will be conducted twice a year, for a period of two years. Monitoring will be conducted in May/June (spring) and August/September (summer). The property owners will be notified of the monitoring event 48 hours prior to the planned event.

4.0 RESTORATION MAINTENANCE

This section discusses alternative maintenance measures to address performance issues observed during monitoring. However, maintenance measures will be necessarily dependent on the conditions encountered, as well as willingness of the property owner to allow additional modifications.

4.1 CREEK STABILIZATION

Three possible maintenance measures will be considered for locations where instability of the creek banks and/or channel has been observed:

- i) Allow the creek to continue to progress naturally.
- ii) Restore the creek according to the Parcel 22 Restoration Plans and the as-recorded information collected.
- iii) Restore the creek using alternative methods which may be more suitable to address the cause of the instability.

Selection of the most appropriate maintenance measure will be made on a case-by-case basis, will depend on the overall creek stability encountered, weigh whether further degradation will occur with possible negative impacts to creek, and possible cause(s) leading to the instability of the creek. Locations requiring additional restoration work will be monitored during the following monitoring period.

4.2 VEGETATIVE COVERAGE

If it is determined that vegetative coverage is not adequate, additional re-seeding or planting may be proposed. This could include replacement of plantings completed by GM with or without a combination of creek stabilization controls to promote "grow-in" (e.g., erosion controls, bank stabilizers).

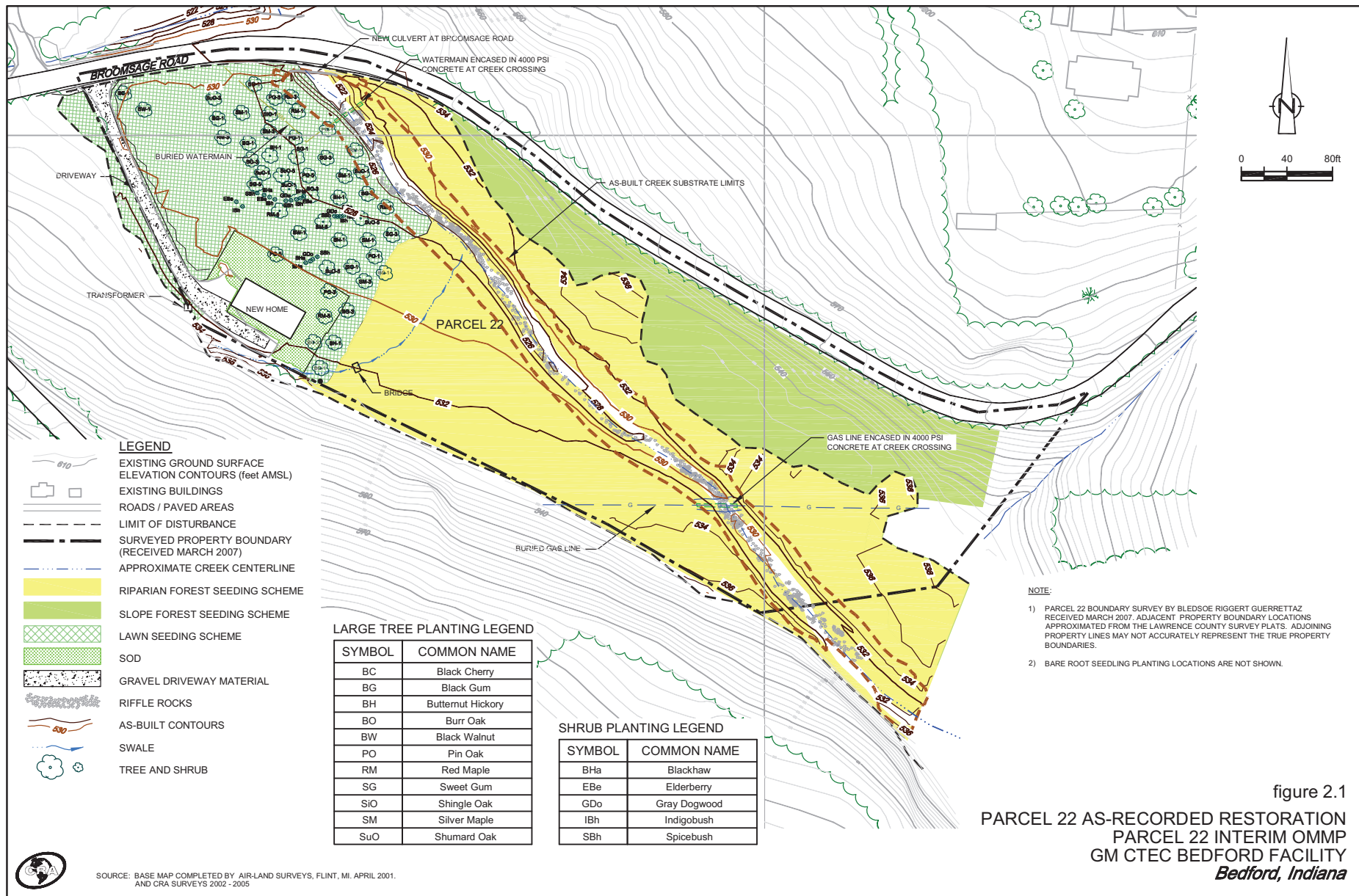
Trees and shrubs that die will be examined on a case-by-case basis to determine factors causing the death and whether replacement is required/warranted.

5.0 REPORTING

Documentation of the monitoring will be submitted annually in report format. The report will summarize findings of the monitoring events completed in that year and include completed monitoring forms. Maintenance measures completed for the restoration and any additional follow-up required will also be described.

6.0 REFERENCES

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.



SOURCE: BASE MAP COMPLETED BY AIR-LAND SURVEYS, FLINT, MI, APRIL 2001.
 AND CRA SURVEYS 2002 - 2005

TABLE 2.1

**TREE/VEGETATION SUMMARY
PARCEL 22 IOMMP
GM CTEC BEDFORD FACILITY
BEDFORD, INDIANA**

<i>Tree/Shrub</i> ^{1,3}	<i>Quantity</i>	<i>Common Name</i>	<i>Comments</i> ²	
Large Trees (2-3" cal)	3	Black Gum		
	2	Burr Oak		
	2	Pin Oak		
	2	Red Maple		
	2	Shumard Oak		
	2	Silver Maple		
	2	Sweet Gum		
	2	Black Cherry		
	Large Trees (3/4-1" cal)	3	Black Gum	1 Black Gum relocated on 4/18/07
		2	Black Walnut	1 Black Walnut relocated on 4/18/07
4		Butternut Hickory	1 Butternut Hickory relocated on 4/18/07	
3		Pin Oak	1 Pin Oak relocated on 4/18/07	
3		Red Maple		
2		Shingle Oak	1 Shingle Oak relocated on 4/18/07	
3		Shumard Oak		
3		Silver Maple		
2		Sweet Gum		
Large Trees (5" cal.)		2	Pin Oak	
	2	Red Maple		
	2	Shumard Oak		
	1	Silver Maple		
	1	Sweet Gum		
	Shrubs (1 gal) ⁴	4	Gray Dogwood	
4		Indigobush		
4		Blackhaw		
4		Elderberry		
4		Spicebush		
Bare Root Seedlings ⁵	25	Black Cherry		
	15	Black Gum		
	35	Black Walnut		
	40	Burr Oak		
	35	Butternut Hickory		
	85	Pin Oak		
	60	Red Maple		
	95	Shellbark Hickory		
	40	Shingle Oak		
	65	Shumard Oak		
	40	Silver Maple		
	40	Sweet Gum		
	40	Sycamore		

Notes:

1. Caliber (cal.) is the measurement of the tree trunk diameter for single-trunk deciduous trees that are more than 6 feet in height.
2. Other restoration features included the application of grass/wildflower seed mix, slope forest seed mix, lawn seed mix and sod.
3. A Total of 50 trees were planted.
4. A total of 20 shrubs were planted.
5. A total of 615 bare root seedlings were planted.

TABLE 3.1
SPECIES ABUNDANCE CATEGORIES FOR GRASSES
PARCEL 22 IOMMP
GM CTEC 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
PARCEL 22 IOMMP
GM CTEC 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

MONITORING FORM

