



# THE CLINTON RIVER WATERSHED MANAGEMENT PLAN

for improving water quality in the North Branch, Clinton River, Lake St. Clair, and the Great Lakes

NORTH BRANCH  
CLINTON RIVER  
SUBWATERSHED

## *The Unified Subwater and Site Reconnaissance* for the North Branch Clinton River Watershed (2009)

Urban Subwatershed Restoration Manual Series

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CENTER FOR  
WATERSHED  
PROTECTION  
Manual 11



TETRA TECH

# Table of Contents

## Table of Contents

Executive Summary ..... 1  
Introduction..... 4  
Neighborhood Source Assessment ..... 5  
Hotspot Site Investigation..... 14  
Pervious Area Assessment..... 21  
Street and Storm Dain Assessment..... 25  
Appendix: Assessment Results..... 29

## List of Tables

Table 1: Estimated Age by Residence Type ..... 5  
Table 2: Index of Infill-Redevelopment and Remodeling by Residence Type\* ..... 5  
Table 3: Information for Extrapolating Data to Entire Watershed ..... 8  
Table 4: NSA Extrapolation Percentages ..... 9  
Table 5: Land Use Categories of Hot Spots Investigated ..... 14  
Table 6: Activities per Site ..... 14  
Table 7: Repair or Store Outside and Runoff Diversion Methods Used ..... 15  
Table 8: Presence of Loading Zone by Land Use Type..... 15  
Table 9: Presence of Outside Storage Areas by Land Use Type ..... 16  
Table 10: Type of Waste by Land Use Type ..... 16  
Table 11: Is a dumpster at or close to the site..... 17  
Table 12: Building Age by Land Use Type ..... 17  
Table 13: Building Conditions..... 17  
Table 14: Are there parking lots associated with the site?..... 18  
Table 15: Condition of Parking Lot by Land Use Type ..... 18  
Table 16: Hot Spot Evaluation..... 19  
Table 17: Extrapolation of survey site land uses to entire watershed..... 19  
Table 18: PAA Extrapolation Land Use Estimates..... 23  
Table 19: Adjacent Land Uses ..... 25  
Table 20: Road Type..... 25  
Table 21: Condition of Pavement by Road Type..... 26  
Table 22: On street parking by Road Type..... 26  
Table 23: Trash in the Gutters ..... 26  
Table 24: Catch Basin Observations..... 27  
Table 25: Degree of Pollutant Accumulation ..... 27  
Table 26: Macomb County and NBCR estimated road miles..... 28

# Table of Contents

## List of Figures

Figure 1: Typical Suburban Landscape ..... 5

Figure 2: Single Family Residential ..... 7

Figure 3: Typical Impervious Surface ..... 9

Figure 4: Sediment going to Drain ..... 12

Figure 5: Garbage on Drain ..... 13

Figure 6: Garbage Dumpster ..... 16

Figure 7: Material at Rear of Commercial Site ..... 17

Figure 8: Outdoor Storage Area ..... 20

Figure 9: Park Structure ..... 21

Figure 10: Parking Lot ..... 22

Figure 11: Overhead wires as a constraint .....24

Figure 12: Lack of Containment on a Connected Impervious Surface ..... 24

Figure 13: Sediment and Pollutant Source ..... 25

Figure 14: Typical Suburban Streetscape ..... 25

Figure 15: Street Debris ..... 27

Figure 16: Street Sweeper ..... 28

## ***Executive Summary***

In the summer of 2009 the Macomb County Public Works office and other volunteers conducted upland assessments in the North Branch of the Clinton River Watershed. The purpose of the assessment was to examine pollution sources and restoration potential within upland areas of urban sections of the watershed. The protocol used was the Center for Watershed Protection's Unified Subwatershed and Site Reconnaissance (USSR) manual. Sites for the USSR were chosen to be representative of the non-agricultural landscape. Consequently, urban areas corresponding to city' suburbs (4 sites), villages (2 sites) and townships-rural (two sites) were chosen. A total of approximately four square miles were surveyed which was ten percent of the urbanized land uses within the watershed.

The USSR has four assessment components and the chapters in this report reflect them. Each is summarized below followed by the recommendations developed from the analysis of the data.

### ***Neighborhood Source Assessment (NSA)***

There were sixteen (16) single family residential, four (4) multiple family residential and four (4) mobile home park areas surveyed for a total of twenty-four (24) neighborhoods. About 70 percent of neighborhoods were "typical" in design (curb and gutter, paved driveways, sidewalks both sides etc.).

About 54 percent of the lots had greater than 45 percent impervious cover.

Half the neighborhood had less than 5 percent forest canopy. Only 2 neighborhoods had 75 percent or more forest canopy.

Sediment (six areas) and nutrients (four areas) were the two most reported pollutants.

Eighteen (18) neighborhoods earned a "moderate" rating on the *Pollutant Severity Index* by the survey teams; while fourteen (14) neighborhoods received "moderate" ratings on the *Restoration Index* by the survey teams.

The most recommended action (15 areas) by the survey teams was to encourage "better lawn/landscape practices."

### ***Hot Spot Investigation (HSI)***

There were twenty-two (22) potential hot spot locations were investigated. Fifteen (15) were commercial, four (4) municipal, and one (1) each of industrial, institutional, and transport-related. Hot spot sites ranged from gas stations (2) to a hotel, motel, restaurant and a strip mall.

Fourteen (14) sites (64%) were classified as confirmed hot spots, six (6) of which were deemed to be severe. Four (4) were potential hot spots. Four (4) were deemed as not being hot spots.

Multiple recommendations can apply to one site. Therefore, twenty (20) sites were recommended for a future education effort as a follow-up action, while two (2) were recommended for follow-up sites inspections and one for a retrofit.

# Executive Summary

## ***Pervious Area Assessment (PAA)***

The Pervious Area Assessment surveyed seven (7) recreational sites and three (3) institutional sites for a total of ten (10) sites. Three (3) were schools, five were parks, one was the fair grounds and the last was a trail.

All survey sites were public lands. Three (3) were schools, five (5) were parks, one (1) was the fair grounds and the last (1) was a trail.

General observations included that there is an opportunity to plant trees in many of the open areas; that connectivity of wetland with other wetlands and forested areas could be improved and; that soil compaction was observed at seven sites, erosions and poor vegetations at four (4) sites.

The initial summary recommendations\* for the investigated sites are:

- 2 sites - Good candidate for conservations/protection.
  - 2 sites - Potential restoration candidate.
  - 4 sites - Poor restoration or conservation candidate.
  - 4 sites - May be reforested with minimal site preparation.
- \* Sites can be associated with more than one recommendation.

## ***Street and Storm Drain (SSD)***

The Street and Storm Drain assessed forty-two (22) street areas. Twenty-one (21) had sediment present, twenty-two had organic matter, and twenty-two has litter in the gutters.

A total of twenty-two (22) storm drains were observed. Fourteen of twenty-two (64%) them exhibited a low degrees of pollutant accumulation, five (5) had a medium level of pollution and three (3) had a high level.

Three (3) pollution prevention strategies were considered, street sweeping, storm drain stenciling, and catch-basin cleaning out. Thirty-one (31) sites had potential for one or more of these strategies.

- Only two areas had storm drain stenciling.
- Three sites were recommended for street sweeping.
- One site was recommended for catch-basin cleaning.
- Additionally, six sites were recommended for bioswales retrofits.

## ***Recommendations***

The following recommendations were developed based on the survey observations extracted to the entire watershed.

From the Neighborhood Source Assessment

1. Classify of neighborhoods based on their current ability to manage storm water as well as to be retrofitted with storm water facilities. The NSA suggests that the age and type of the neighborhood as well as proximity to connected waterways are key factors.
2. Based on the classification from recommendation 1, work with volunteer organizations to 'green' neighborhoods that would most benefit from retrofits.
3. In general, plant more trees. Use mechanisms such as the Conservation Districts tree sale, Arbor Day, etc, to encourage the planting of trees. Produce a pamphlet (or promote and

existing one) that directs people on where to plant trees, how to plant them, and what native species are recommended under different circumstances.

4. Implement downspout disconnection programs to reduce the volume to storm systems and local waterways.
5. Initiate an “adopt a storm sewer” program where residence accept responsibility for keeping debris and pollutants entering the system in their neighborhood.
6. Expand promotion of the “Seven Step” program to reach a larger audience. One way might be to partner with lawn and garden centers to distribute educational materials.

### From the Pervious Area Assessment

7. Create a watershed-wide landscape restoration plan whose goal is the long-term sustainability of habitat. The Michigan Natural Features Inventory and the recently completed MDEQ Potential Wetland inventory both provide a good foundation from which to build.

### From the Street and Storm Drain

8. Prioritize street sweeping and catch basin cleaning on State Trunklines, County Primary, and City Major roads (total of 459 miles) so the most heavily used roadways receive additional cleanings.
9. Expand education on stormwater, especially the stenciling program in residential neighborhoods.
10. Continue to enforce the SESC requirements for new construction.

### From the Hot Spot Investigation

11. Implementing an stormwater education initiative targeted at commercial/retail, and industrial businesses (it is assumed that the Phase II permit will address the municipal sites). Education should focus on vehicle, material, and waste management and for storm water protection.
12. Initiating a beautification program targeted at local business that incorporates storm water management facilities and reduces impervious surfaces.
13. Both items 1 and 2 should be priorities by areas in close proximity to connected water features.

## *Introduction*

In the summer of 2009 the Macomb County Public Works office and other volunteers conducted upland assessments in the North Branch of the Clinton River Watershed. The purpose of the assessment was to examine pollution sources and restoration potential within upland areas of urban sections of the watershed. The protocol used was the Center for Watershed Protection's Unified Subwatershed and Site Reconnaissance (USSR) manual. It was developed to help watershed groups, municipal staff, and consultants quickly assess subwatershed restoration potential. The USSR is quick and inexpensive, applies over a wide range of urban conditions, and has four major assessment components:

1. *Neighborhood Source Assessment (NSA)* that profiles pollution source areas, stewardship behaviors, and residential restoration opportunities within individual neighborhoods.
2. *Hotspot Site Investigation (HSI)* that ranks the potential severity of commercial, industrial, municipal or transport-related hotspot found within a subwatershed.
3. *Pervious Area Assessment (PAA)* that evaluates the potential to reforest turf areas or restore natural area remnants at all open parcels within a subwatershed.
4. *Streets and Storm Drains (SSD)* that measures the average pollutant accumulation in the streets, curbs, and catch basins of a subwatershed, and investigates the on-site retrofit potential for parking lots.

Sites for the USSR were chosen to be representative of the non-agricultural landscape. Consequently, urban areas corresponding to city' suburbs (4 sites), villages (2 sites) and townships-rural (two sites) were chosen. A total of approximately four square miles were surveyed which was ten percent of the urbanized land uses within the watershed.

The USSR is a "windshield survey" that requires you to drive down every street in a subwatershed to locate possible restoration sites and assess their restoration potential, and determines specific pollution sources and hotspots. The analysis and recommendations generated from the data collected through the USSR survey will help in shaping the initial subwatershed restoration strategy and locating upland restoration projects that deserve further investigation.

This report is broken down into chapters that parallel the four assessment components listed above. The basic layout of each chapter follows the respective field forms. There is a summary at the end of each chapter and the results are extrapolated out to be representative of the entire watershed. Every effort was made to obtain the most representative metrics available to base the whole watershed projections.

**Figure 17: Typical Suburban Landscape**



# Neighborhood Source Assessment (NSA)

## ***Neighborhood Source Assessment***

This chapter summarizes the data collected for the “Neighborhood Source Assessment” in order to make recommendations for future management. The subtitles in bold-italic correspond with the sections on the NSA field form unless otherwise noted. Many of the results are preceded by their corresponding alpha-numeric number on the field form.

### ***Neighborhood Characterization***

The NSA surveyed sixteen (16) single family and four multiple family residential areas as well as four (4) mobile home parks. The following characterize the neighborhoods surveyed.

**Table 1: Estimated Age by Residence Type**

	Neighborhood Resident Type			Total
	Mobile Home	Multi-family	Single Family Detached	
Est. Age	0	0	3	3
100+	0	0	5	5
1-10	1	1	6	8
11-25	1	1	1	3
26-50	1	1	1	3
51-99	1	0	1	2
Total	4	3	17	24

**Figure 18: Single Family Residential**



Fifteen of the twenty-four (24) neighborhoods had garages. An estimated twelve (12) neighborhoods had basements. Twenty (20) neighborhoods were serviced by sewers. (Denotes potential pollutant source).

The index of *Infill-Redevelopment and Remodeling* is an estimate of the percentage of homes in the neighborhood undergoing infill, redevelopment, or remodeling.

**Table 2: Index of Infill-Redevelopment and Remodeling by Residence Type\***

	Neighborhood Resident Type			Total
	Mobile Home	Multi-family	Single Family Detached	
Infill Index	0	1	3	4
< 5%	2	0	3	5
>10%	0	0	1	1
None	2	2	10	14
Total	4	3	17	24

### ***Neighborhood Characterization Summary***

Sixty-two percent of the surveyed neighborhoods had garages. The presence of garages increases the impervious surface footprint per lot and therefore per neighborhood.

Eighty percent of the surveyed neighborhoods were serviced by sewers. As shown from the age of the neighborhoods surveyed, there are approximately one-third that are over 50-years of age. These areas pose possible threats to the areas water quality if sewers are not maintained.

# Neighborhood Source Assessment (NSA)

The majority of neighborhoods have less than a ten (10) percent opportunity for redevelopment or remodeling. The low index suggests there is a significant barrier to managing stormwater.

## *Yard and Lawn Conditions*

- B1 – About forty-six (46) percent of the lots had less than forty-five (45) percent impervious cover.
- B2 – A little over seventy (70) percent of the lots surveyed had less than forty-five (45) percent of their lots covered with grass.
- B3 – A little over seventy (70) percent of the lots surveyed have fifteen (15) percent or less of their lots landscaped (e.g. mulched beds)
- B4 – About eighty-eight (88) percent of the lots surveyed had less than ten (10) percent of their area with bare soil.
- B5 – Twelve (12) neighborhoods (50%) had less than five (5) percent forest canopy, while only two (2) neighborhoods had seventy-five (75) percent or more forest canopy.
- B6 – Eight (8) lots (33%) surveyed do not have any irrigation and eleven (46%) had irrigation.
- B7 – Turf management for the surveyed neighborhoods indicated that thirty-eight (38) percent were maintained to a “high” level, twenty-five (25) percent to a “medium” level, twenty-one (21) percent to a low level and one (1) percent had a mixed status.
- B8 – Eleven (11; 45.8%) of neighborhoods did not have swimming pools, ten (10; 41.6%) had ten (10) or fewer, while only three (3; 12.5%) had between ten (10) and twenty (20) pools.
- B9 – Sixteen (16; 67%) of the neighborhoods did not have any trash, while seven (7; 29%) had trash or junk in their yards.

## *Driveways, Sidewalks and Curbs*

- C1 – Eighteen (18; 72%) of the neighborhoods had mostly impervious driveways (80% + of households).
- C2 – Twelve (12; 50%) of the neighborhoods were clean, nine (9; 39.5%) were in disrepair (breaking-up), and ten (10; 41.6%) were either stained or dirty. (These are not mutually exclusive categories).
- C3a – Sixteen (16; 67%) neighborhoods had sidewalks on both sides of the street, two (2; 8%) had them on one side of the street and the remainder six (6; 25%) either did not have any or were not reported.
- C3b – Only five (5; 21%) of the neighborhood had grass clippings present and ten (10; 41.6%) of the neighborhoods were receiving “non-targeted” irrigation.
- C3c – The average distance of sidewalks (if present) was eight (8) feet. Six (6) neighborhoods had 5 ft. of less.
- C3d – Only one neighborhood was reported to have pet waste present in the area while eighteen (18; 75%) were reported to be clean.
- C4 – Eighteen (18; 75%) of the surveyed neighborhoods were curb and cutter.
- C4a – Seven (7; 29%) neighborhoods had “clean and dry” gutters, three (3; 12.5%) had flowing water.
- C4b – Seven (7; 29%) neighborhoods had organic matter present, four (4; 19%) had sediment and three (3; 12.5%) had trash. Four (4; 19%) neighborhoods had tree canopies.

## *Rooftops*

- D1 – Eight (8; 33.3%) of the neighborhoods did not have their downspouts directly connected to the storm drains/sanitary. Three (3; 12.5%) of the neighborhoods had fewer than five (5)

# Neighborhood Source Assessment (NSA)

connected, five (5; 20.8%) had between ten (10) and forty (40) connected and two (2; 8%) had greater than eighty (80) connected.

- D2 – Two (2) neighborhoods had between twenty-five (25) to thirty (30) downspouts directed towards impervious surfaces, two (2) neighborhoods had sixty (60) to seventy (70) downspouts directed towards impervious surfaces.
- D3 – Sixteen (16; 67%) of the neighborhoods indicated that a majority of the homes (60% plus) directed their downspouts towards pervious surfaces. Three (3; 12.5%) neighborhoods indicated that only twenty (20) to thirty (30) percent of the downspouts were directed towards pervious surfaces.
- D4 – One (1; 4%) multi-family neighborhood used rain barrels.
- D5 – Ten (10; 41.6%) neighborhoods had sufficient downward slope to accommodate a flow to a rain garden.

## ***Common Areas***

- E1 – Eighteen (18; 72%) neighborhoods had storm drains, five (5; 21%) did not and one (1; 4%) was not reported.
- E1b – Only two (2; 8%) neighborhoods had drain stenciling and sixteen (16; 67%) did not.
- E1c – Ten (10; 41.6%) of the neighborhoods had clean catch basins and five (5; 21%) were dirty.
- E2 – Five (5; 21%) had storm water ponds, four wet and one dry.
- E2b – Two (2) of the ponds were over grown, one (1) wet and one (1) dry.
- E2c – Four (4) if the ponds serviced about a one (1) acre area.
- E3 – Only five (5; 21%) of sites had open space associated with them.
- E3b – None of the five (5) had any visible pet waste or dumping of waste.
- E3c – Only one (1) open space area had buffers present. The buffer did not exhibit signs of encroachment.

## ***Initial Neighborhood Assessment and Recommendations***

F1 – The following were reported as being present for the initial assessment of the surveyed neighborhoods:

Nutrients	four (4) sites
Oil & Grease	one (1) site
Trash/Liter	three (3) sites
Bacteria	two (2) sites
Sediment	six (6) sites

F2 – The following summarizes the field crews *recommended actions*:

Better lawn/landscape practices	fifteen (15) neighborhoods
Better management of common space	one (1) neighborhood
Pond retrofit	four (4) neighborhoods
Education	one (1) neighborhood
Rain Garden	one (1) neighborhood

F3 – Pollutant Severity Index

On a scale of low, moderate, high and severe the following summarizes the surveyed sites:

Low	Three (3; 12.5%)	High	two (2; 1%)
Moderate	eighteen (18; 75%)	Unreported	one (1; 4%)

# Neighborhood Source Assessment (NSA)

## F4 – Neighborhood Restoration Index

On a scale of low, moderate and high the following summarizes the surveyed sites:

Low                    six (6; 25%)  
 Moderate            fourteen (14; 58.3%)  
 High                    three (3; 12.5%)

**Figure 19: Typical Impervious Surface**



### **Summary of Key Observation for the Surveyed Sites**

- Sixteen (16) single family residential, four (4) multiple family residential and four (4) mobile home park areas were surveyed.
- About fifty-four (54%) percent of the lots had greater than forty-five (45%) percent impervious cover.
- About seventy (70%) percent of neighborhoods were “typical” in design (curb and gutter, paved driveways, sidewalks both sides etc.).
- Half the neighborhood had less than five (5%) percent forest canopy.
- Only two (2) neighborhoods had seventy-five (75%) percent or more forest canopy.
- Sediment (six (6) areas) and nutrients (four (4) areas) were the two (2) most reported pollutants.
- The most recommended action (fifteen (15) areas) by the survey team was to encourage “better lawn/landscape practices.
- Eighteen (18) neighborhoods earned a “moderate” rating on the Pollutant Severity Index by the survey teams.
- Fourteen (14) neighborhoods received “moderate” ratings on the Restoration Index by the survey teams.

### **Extrapolation to the Entire Watershed**

The survey sites were categorized by the residential type and their estimated age. They were then extrapolated by category to the entire watershed based on the Macomb County 2000 census data. Since about ten percent of the watershed lies outside Macomb County this is not a perfect match and the numbers presented in this section should only be considered estimates. Table 3 presents the percentage and number of unit estimates for the entire 34,875 households in Macomb County by category. Categories from the survey were summed together to align with the census categories. Unfortunately, the age for three of the single family detached residential sites was not reported.

**Table 3: Information for Extrapolating Data to Entire Watershed**

Residence Type	Estimated Age:								Totals	
	% throughout Watershed								Estimated No. of Units	
	Not Reported	1-10		11 to 50		51 +		%	Est. No. of Units	
Mobile Home	0.0%	0	4.2%	1,453	8.3%	2,906	4.2%	1,453	<b>16.7%</b>	<b>5,813</b>
Multifamily	0.0%	0	8.3%	2,906	8.3%	2,906	0.0%	0	<b>16.7%</b>	<b>5,813</b>
SF Detached	12.5%	4,359	25.0%	8,719	8.3%	2,906	20.8%	7,266	<b>66.7%</b>	<b>23,250</b>
<b>Totals</b>	<b>12.5%</b>	<b>4,359</b>	<b>37.5%</b>	<b>13,078</b>	<b>25.0%</b>	<b>8,719</b>	<b>25.0%</b>	<b>8,719</b>	<b>100.0%</b>	<b>34,875</b>

# Neighborhood Source Assessment (NSA)

The majority of the homes in the watershed are single family detached residences (66.7%) with the most being under ten years old (37.5%). The remainder of the single family residential homes are distributed evenly between the eleven (11) to fifty (50) year category and the fifty 50+ year category. Both the mobile home and multifamily properties represent about seventeen (17%) percent of the residential categories.

Below are seven tables with percentage and unit estimates at various thresholds. Percentages for each of the questions from above are associated with each tables based on the estimated observed levels (i.e. the above estimates only have to be close to be associated with a table). For example, B1 is associated with the 45%-55% table because the field crews observed about forty-six (46%) of the lots with less than forty-five (45%) percent impervious cover. The 45%-55% table then presents the extrapolated estimates of how many lots this equates to watershed-wide.

**Table 4: NSA Extrapolation Percentages**

88%+	ESTIMATAGE: % of Watershed\Estimated No. of Units								Totals	
	Not Reported	1-10	11 to 50	51 +	%	Est. No. of Units				
Residence Type										
Mobile Home	0%	0	4%	1,279	7%	2,558	4%	1,279	15%	5,115
Multifamily	0%	0	7%	2,558	7%	2,558	0%	0	15%	5,115
SF Detached	11%	3,836	22%	7,673	7%	2,558	18%	6,394	59%	20,460
<b>Totals</b>	<b>11%</b>	<b>3,836</b>	<b>33%</b>	<b>11,509</b>	<b>22%</b>	<b>7,673</b>	<b>22%</b>	<b>7,673</b>	<b>88%</b>	<b>30,690</b>

**Yard and Lawn:**

B4: Percent of properties with less than 10% bare soil

65% - 75%	ESTIMATE AGE: % of Watershed\Estimated No. of Units								Totals	
	Not Reported	1-10	11 to 50	51 +	%	Est. No. of Units				
Residence Type										
Mobile Home	0.0%	0	3%	1,000	5.5%	2,000	3%	1,000	11.5%	4,000
Multifamily	0.0%	0	5.5%	2,000	5.5%	2,000	0.0%	0	11.5%	4,000
SF Detached	9%	3,000	16.5%	6,100	5.5%	2,000	14.5%	5,000	45.5%	16,100
<b>Totals</b>	<b>9%</b>	<b>3,000</b>	<b>25%</b>	<b>9,100</b>	<b>16.5%</b>	<b>6,100</b>	<b>17.5%</b>	<b>6,000</b>	<b>68.5%</b>	<b>24,200</b>

**Yard and Lawn**

B2: Percent of properties with less than 45% of lot with grass cover

B3: Percent of properties with 15% or less of lot with landscaping (e.g. mulched bed areas)

B9: Percent of properties with without junk or trash in yard

**Driveways, Sidewalks and Curbs**

C1: Percent of driveways that are impervious

C3a: Percent of properties with sidewalks on both sides of the street.

C3d: Percent of properties with pet waste present in sidewalk area

C4: Percent of properties with curb and gutter

**Rooftops**

D3: Percent of properties with downspouts are discharged to impervious surfaces

# Neighborhood Source Assessment (NSA)

## Common Areas

E1: Percent of neighborhoods with storm drain

E1b: Storm drains are stenciled

45%-55%	ESTIMATE AGE: % of Watershed\Estimated No. of Units								Totals	
	Not Reported	1-10	11 to 50	51 +	%	Est. No. of Units				
Residence Type										
Mobile Home	0%	0	2%	650	4.5%	1,450	2%	750	8%	<b>2,850</b>
Multifamily	0%	0	4.5%	1,400	4.5%	1,450	0%	0	8%	<b>2,850</b>
SF Detached	6.5%	2,200	12.5%	4,050	4.5%	1,450	10%	3,650	30%	<b>11,350</b>
<b>Totals</b>	<b>6.5%</b>	<b>2,200</b>	<b>19%</b>	<b>6,100</b>	<b>13.5%</b>	<b>4,350</b>	<b>12.5%</b>	<b>4,400</b>	<b>45%</b>	<b>17,050</b>

## Yard and Lawn

B1: Percent of properties with less than 45% of lot with impervious cover

B5: Percent of properties with less than 5% of lot with forest canopy

B8: Percent of neighborhoods that did not have outdoor pool

## Driveways, Sidewalks and Curbs

C2a: Percent of neighborhoods that are clean

40%	ESTIMATE AGE: % of Watershed\Estimated No. of Units								Totals	
	Not Reported	1-10	11 to 50	51 +	%	Est. No. of Units				
Residence Type										
Mobile Home	0%	0	2%	581	3%	1,163	2%	581	7%	<b>2,325</b>
Multifamily	0%	0	3%	1,163	3%	1,163	0%	0	7%	<b>2,325</b>
SF Detached	5%	1,744	10%	3,488	3%	1,163	8%	2,906	27%	<b>9,300</b>
<b>Totals</b>	<b>5%</b>	<b>1,744</b>	<b>15%</b>	<b>5,231</b>	<b>10%</b>	<b>3,488</b>	<b>10%</b>	<b>3,488</b>	<b>40%</b>	<b>13,950</b>

## Yard and Lawn

B6: Percent of properties without irrigation

B7: Percent of properties that maintain their turf grass at a high level.

B8: Percent of neighborhoods with 10 or fewer outdoor pools

## Rooftops

D5: Percent of neighborhoods with sufficient slope to accommodate flow to a rain garden.

## Driveways, Sidewalks and Curbs

C2: Percent of neighborhoods with driveways, sidewalks and curbs in disrepair or are either stained or dirty

C3b: Percent of neighborhoods with non-targeted irrigation

## Common Areas

E1c: Percent of neighborhoods with clean catch basins

# Neighborhood Source Assessment (NSA)

30%	ESTIMATE AGE: % of Watershed\Estimated No. of Units									Totals
	Residence Type	Not Reported	1-10		11 to 50		51 +		%	Est. No. of Units
Mobile Home	0%	0	1%	436	3%	872	1%	436	5%	1,744
Multifamily	0%	0	3%	872	3%	872	0%	0	5%	1,744
SF Detached	4%	1,308	8%	2,616	3%	872	6%	2,180	20%	6,975
<b>Totals</b>	<b>4%</b>	<b>1,308</b>	<b>11%</b>	<b>3,923</b>	<b>8%</b>	<b>2,616</b>	<b>8%</b>	<b>2,616</b>	<b>30%</b>	<b>10,463</b>

### Yard and Lawn

B6: Percent of properties that do not have irrigation

B9: Percent of properties that have trash in their yards

### Driveways, Sidewalks and Curbs

C4a: Percent of neighborhoods that had clean and dry gutters

C4b: Percent of neighborhoods that had organic matter present

### Rooftops

D1: Percent of neighborhoods that did not have downspouts connected directly to the storm drains/sanitary

20%	ESTIMATE AGE: % of Watershed\Estimated No. of Units									Totals
	Residence Type	Not Reported	1-10		11 to 50		51 +		%	Est. No. of Units
Mobile Home	0%	0	1%	291	2%	581	1%	291	3%	1,163
Multifamily	0%	0	2%	581	2%	581	0%	0	3%	1,163
SF Detached	3%	872	5%	1,744	2%	581	4%	1,453	13%	4,650
<b>Totals</b>	<b>3%</b>	<b>872</b>	<b>8%</b>	<b>2,616</b>	<b>5%</b>	<b>1,744</b>	<b>5%</b>	<b>1,744</b>	<b>20%</b>	<b>6,975</b>

### Yard and Lawn

B7: Percent of neighborhoods that maintained their turf grass to a medium and to low level

### Driveways, Sidewalks and Curbs

C3a: Percent of neighborhoods with no sidewalks (or were not reported)

C3b: Percent of neighborhoods with grass clippings present

C4b: Percent of neighborhoods with sediment present

### Rooftops

D1: Percent of neighborhoods with fewer than five (5) downspouts directly connected to the storm drain/sanitary

### Common Areas

E1: Percent of neighborhoods that did not have storm drain

E1c: Percent of neighborhoods that have dirty catch basins

E2: Percent of neighborhoods that had water ponds

E3: Percent of neighborhoods with open space

E3b: Percent of neighborhoods that had visible pet waste or dumping of waste

# Neighborhood Source Assessment (NSA)

10% Residence Type	ESTIMATE AGE: % of Watershed\Estimated No. of Units								Totals	
	Not Reported	1-10		11 to 50		51 +		%	Est. No. of Units	
Mobile Home	0%	0	0%	145	1%	291	0%	145	2%	<b>581</b>
Multifamily	0%	0	1%	291	1%	291	0%	0	2%	<b>581</b>
SF Detached	1%	436	3%	872	1%	291	2%	727	7%	<b>2,325</b>
<b>Totals</b>	<b>1%</b>	<b>436</b>	<b>4%</b>	<b>1,308</b>	<b>3%</b>	<b>872</b>	<b>3%</b>	<b>872</b>	<b>10%</b>	<b>3,488</b>

### Yard and Lawn

B8: Percent of neighborhoods that had between ten (10) and twenty (20) pools

### Driveways, Sidewalks and Curbs

C3a: Percent of neighborhoods with sidewalks on one side of the street

C4a: Percent of neighborhoods that have gutters with flowing water

C4b: Percent of neighborhoods that have trash visible

### Rooftops

D1: Percent of neighborhoods that have fewer than five (5) or greater than 80 downspouts directly connected to the storm drains/sanitary

D3: Percent of neighborhoods that have between twenty (20%) Percent to thirty (30) percent of the properties with downspouts directly connected to impervious surfaces

### Common Areas

E2c: Percent of neighborhoods with open space areas that have a buffer.

### *Estimated Percentage of Neighborhoods Extrapolated from Initial Recommendations*

F1 – The following are extrapolated as being present based on the initial assessment of the surveyed neighborhoods:

Nutrients	seventeen (17%) of neighborhoods
Oil & Grease	four (4%) of neighborhoods
Trash/Liter	twelve (12.5%) of neighborhoods
Bacteria	eight (8%) of neighborhoods
Sediment	twenty-five (25%) of neighborhoods

**Figure 20: Sediment going to Drain**



F2 – The following summarizes the field crews *recommended actions*:

Better lawn/landscape practices	sixty-two percent (62.5%) of neighborhoods
Better management of common space	four percent (4%) of neighborhoods
Pond retrofit	seventeen percent (17%) of neighborhoods
Education	four percent (4%) of neighborhoods
Rain Garden	four percent (4%) of neighborhoods

# Neighborhood Source Assessment (NSA)

## F3 – Pollutant Severity Index

On a scale of low, moderate, high and severe the following summarizes the condition of the surveyed sites extrapolated to the entire watershed:

Low	twelve percent (12% of neighborhoods
Moderate	seventy-five (75%) of neighborhoods
High	one percent (1%) of neighborhoods
Unreported	four (4%) of neighborhoods

## F4 – Neighborhood Restoration Index

On a scale of low, moderate and high the following summarizes the surveyed sites extrapolated to the entire watershed:

Low	twenty-five percent (25%) of neighborhoods
Moderate	fifty-eight percent (58%) of neighborhoods
High	twelve percent (12%) of neighborhoods

## ***Recommendations***

Based on the above analysis the following actions are recommended.

1. Classify neighborhoods based on 1) their current ability to manage storm water as well as 2) to be retrofitted with storm water facilities. The NSA suggests that the age and type of the neighborhood as well as proximity to connected waterways are key factors.
2. Based on the classification from recommendation 1, work with volunteer organizations to ‘green’ neighborhoods that would most benefit from retrofits.
3. In general, plant more trees. Use mechanisms such as the Conservation Districts tree sale, Arbor Day, etc, to encourage the planting of trees. Produce a pamphlet (or promote an existing one) that directs people on where to plant trees, how to plant them, and what native species are recommended under different circumstances.
4. Downspout disconnection programs to reduce the volume to storm systems and local waterways.
5. Initiate an “adopt a storm sewer” program where residence accept responsibility for keeping debris and pollutants entering the system in their neighborhood.
6. Expand promotion of the “Seven Step” program to reach a larger audience. One way might be to partner with lawn and garden centers to distribute educational materials.

**Figure 21: Garbage on Drain**



# Hotspot Site Investigation (HSI)

## *Hotspot Site Investigation*

This chapter summarizes the data collected for the “Hotspot Site Investigation” in order to make recommendations for future management. The subtitles in bold-italic correspond with the sections on the HSI field form unless otherwise noted. Many of the results are preceded by their corresponding alpha-numeric number on the field form.

### *Locations*

The following summarizes the land use categories investigated:

**Table 5: Land Use Categories of Hot Spots Investigated**

<b>Land Use Category</b>	<b>Frequency</b>	<b>Percent</b>
Commercial	15	68.2
Industrial	1	4.5
Institutional	1	4.5
Municipal	4	18.2
Transport-Related	1	4.5
Total	22	100.0

Hot spot sites ranged from gas stations (2) to a hotel, motel, restaurant and a strip mall.

### *Vehicle Operations*

#### **B1 – Types of Vehicles**

- Three (3) sites are fleet vehicles, one (1) is school busses, and two (2) are other (an auto repair with customer vehicles and a street sweeper).

#### **B2 – Approximate number of vehicles at each site**

- Five (5) sites had ten (10) or less vehicles, Two (2) between fifteen (15) and twenty (20) vehicles, one (1) site varied continuously (the strip mall) and fourteen (14) were unreported.

#### **B3 – Activities Associated with Vehicles.**

Below is a summary of activities associated with vehicles occurring at each site:

**Table 6: Activities per Site**

<b>Activity</b>	<b>No. of Sites</b>	<b>% of Sites</b>
Maintained	7	32
Repaired	4	18
Fueled	3	14
Washed	3	14
Stored	7	32

# Hotspot Site Investigation (HSI)

B4 – Outside repair/storage and runoff diversion methods used

**Table 7: Repair or Store Outside and Runoff Diversion Methods Used**

	Stored/Repaired		Runoff Diversion Methods Used	
	No. of Sites	Percent	No. of Sites	Percent
Not reported	15	68.2	14	63.6
Can't Tell	1	4.5	1	4.5
No	2	9.1	1	4.5
Yes	4	18.2	6	27.3
Total	22	100.0	22	100.0

B5 – Evidence of Leaks and Spills

- Four (4) sites showed evidence of spills or leaks from vehicles, two (2) did not, one (1) could not tell.

B6/B7 – Fuel Areas

- Five (5) sites had uncovered fueling areas
- One (1) of these was directly connected to the storm drains

B8 – Vehicle Washing

- One (1) site washed vehicles outdoors, and five (5) other sites might (Can't Tell)
- Two sites might (Can't Tell) discharge to storm drains.

## ***Outdoor Materials***

C1 – Loading Operations

**Table 8: Presence of Loading Zone by Land Use Type**

LAND USE TYPE	LOADING AREA ?			
	No Loading Area	Can't Tell	Yes	Total
No Loading Area	37	0	0	37
Commercial	7	0	9	16
Industrial	1	0	0	1
Institutional	1	0	0	1
Municipal	2	1	2	5
Transport-Related	1	0	0	1
Total	49	1	11	61

Most of the loading zone areas are associated with commercial land uses (9). Two of them were covered. The other two loading areas were allied with municipal land uses, one of which was covered.

# Hotspot Site Investigation (HSI)

## C2 – Outside Material Storage

**Table 9: Presence of Outside Storage Areas by Land Use Type**

LAND USE TYPE	STORAGE AREA ?			
	No Loading Area	No	Yes	Total
No Loading Area	37	0	0	37
Commercial	2	1	13	16
Industrial	0	0	1	1
Institutional	0	1	0	1
Municipal	0	0	5	5
Transport-Related	0	0	1	1
Total	39	2	20	61

**Figure 22: Garbage Dumpster**



Most of the outside storage areas are associated with commercial land uses (13). Nine (9) stored liquids and one solid storage area were covered. Five (5) other sites with outside storage areas were allied with municipal land uses, two of which stored liquids and one stored solids. The one (1) industrial site had outside storage for solid material and there was one transport-related outdoor site. Eleven (11) outdoor storage areas were on concrete/asphalt and eight (8) were on grass/dirt.

C3 – Nine (9; 45%) outside storage areas were directly or indirectly connected to storm drains. One site you could not tell.

C4 – Twelve (12; 60%) outdoor storage sites exhibited staining that suggests potentially polluting discharges have occurred at sometime in the past.

C5 – Seventeen (17; 85%) outdoor storage sites provided some sort of cover.

C6 – Fourteen (14; 70%) outdoor sites had secondary containment for liquid materials.

C7 – Nine (9; 45%) outdoors sites appeared in poor condition and existed missing labels, rusting, etc. Seven did not exhibit poor conditions. It was not possible to determine the site conditions at two sites.

### ***Waste Management***

#### D1 – Type of Waste

**Table 10: Type of Waste by Land Use Type**

Land Use	WASTE_TYPE			Total
	Construction	Garbage	Hazardous	
Commercial	1	13	0	14
Industrial	1	0	0	1
Institutional	0	1	0	1
Municipal	0	5	0	5
Transport-Related	1	0	0	1
Total	3	19	0	22

# Hotspot Site Investigation (HSI)

Thirteen (13) commercial sites (59%) exhibited garbage, as did five (5) municipal sites (23%) and one (1) industrial site (4.5%).

## D2 – Dumpster Condition

**Table 11: Is a dumpster at or close to the site.**

	DUMPSTER PRESENT					Total
	No Dumpster	No Cover	Damage	Leaking	Overflow	
Commercial	1	6	4	2	1	14
Industrial	0	0	0	0	0	0
Institutional	0	0	1	0	0	1
Municipal	0	2	2	0	0	4
Transport-Related	0	0	0	0	0	0
Total	1	8	7	2	1	19

Commercial dumpster had the greatest problems with six (6) having no covers, four (4) were damaged, two (2) were leaking and one (1) was overflowing. Municipal dumpster exhibited similar problems.

D-3 - Only three (3) dumpsters were in a storm water drain inlet area, two (2) of which failed to provide diversion measures for the storm water.

## Physical Plant

### E-1 Age of Buildings

**Table 12: Building Age by Land Use Type**

LAND USE	BUILDING AGE				Total
	10-19	20-30	40-60	100+	
Commercial	4	4	6	1	15
Industrial	0	0	0	0	0
Institutional	0	0	0	1	1
Municipal	1	3	1	0	5
Transport-Related	0	0	0	0	0
Total	5	7	7	2	21

The median age was about thirty-five (35) to forty (40) years old.

**Table 13: Building Conditions**

Building Conditions	Frequency	Cumulative Percent
Clean	10	45.5
Damaged	1	50.0
Dirty	1	54.5
Stained	10	100.0
Total	22	

\* Note that a building can exhibit multiple conditions. (e.g. stained and dirty)

**Figure 23: Material at Rear of Commercial Site**



# Hotspot Site Investigation (HSI)

- Three (3; 14%) buildings displayed evidence that current maintain practices resulted in discharges to the storm drain.

E3 – Parking Lots associated with sites.

**Table 14: Are there parking lots associated with the site?**

LAND USE TYPE	PARKING AGE		Total
	5-19	20-40	
Commercial	5	8	13
Industrial	0	0	0
Institutional	1	0	1
Municipal	1	3	4
Transport-Related	0	0	0
Total	7	11	18

**Table 15: Condition of Parking Lot by Land Use Type**

LAND USE	CONDITION				Total
	Clean	Dirty	Stained	Damaged	
Commercial	3	8	9	5	25
Industrial	0	1	1	1	3
Institutional	1	0	0	0	1
Municipal	0	1	1	3	5
Transport-Related	0	0	1	1	2
Total	4	10	12	10	36

\* Note that parking lots can exhibit multiple conditions. (e.g. stained and dirty)

- Fifteen (15) parking lots were paved/concrete, two (2) were gravel, and one(1) was a mix of both

E3 – Thirteen sites (13; 75%) of sites discharged their downspouts to impervious surfaces. Six (6; 33%) of which were directly connected to storm drains.

E4 – Only two (2) sites showed signs of poor cleaning practices for construction activities.

### ***Turf/Landscaping Areas***

F1 – Seven sites had some sort of landscaping. Four of seven sites (57%) had greater than seventy (70%) of their property covered in turf grass. Five sites has less than twenty-five percent (25%) with forest on site, while six have some bare soil exposed, one of which had one-hundred percent (100%) bare soil surrounding it.

F2 – Of the nine (9) sites with turf grass, two (2) were managed at a high level, five (five) at a medium level and two (2) at a low level

F3 – Three (3) sites had (non-targeted) irrigation systems

# Hotspot Site Investigation (HSI)

F4 – Two (2) sites had landscaped areas that drain to the storm drains.

F5 – Two (2) sites had organic matter (leaves, grass clippings) accumulation on adjacent impervious surfaces.

### ***Storm Water Infrastructure***

G1 – None of the sites had storm water treatment practices on present.

G2 – Six (6) sites had private storm drains located on the facility. All gutters on each site were rated from fair to clean for the presents of sediment, organic material, and litter.

### ***Initial Hotspot Status***

The following table reflects the field crews’ initial evaluation of each of the sites surveyed on whether they can be considered a hot spot.

**Table 16: Hot Spot Evaluation**

Status	Frequency	Percent	Cumulative Percent
Not a Hot Spot	4	18.0	18.0
Potential Hot Spot	4	18.0	36.0
Confirmed Hot Spot	8	36.0	72.0
Severe Hot Spot	6	28.0	100.0
Total	22	100.0	

Fourteen sites (14; 64%) were classified as confirmed hot spots, six (6) of which were deemed to be severe.

Twenty (20) sites were recommended for a future education effort as a follow-up action. Two (2) were recommended for follow-up sites inspections and one for a retrofit.

### ***Extrapolation***

Table 17 shows the land use categories of the surveyed sites extrapolated to the Macomb County portion of the watershed (about ninety percent (90%) of the watershed).

**Table 17: Extrapolation of survey site land uses to entire watershed**

Land Use Category	Survey		Estimated No. of affected Entities in the Watershed*	
	Frequency	Percent	Frequency	Percent
Commercial (Retail mostly)	15	68.2	711	18.2
Industrial	1	4.5	384	9.8
Institutional	1	4.5	88	2.3
Municipal	4	18.2	83	2.1
Transport-Related	1	4.5	107	2.7
Total	22	100.0	1373	35.1

\* Macomb County portion of the watershed only. Totals are based on information supplied by Macomb County Planning and Economic Development.(MCPED, 2010)

# Hotspot Site Investigation (HSI)

There are an estimated 1373 hot spots within the watershed.

There are seven (7) sites surveyed that were associated with vehicle operations. A high percentage of them exhibited evidence of spills, uncovered fueling areas and questionable vehicle washing practices. There are 122 (3.1%) of the businesses in the watershed that are directly related to automobiles and numerous other land uses that have vehicle operations associated with them (MCPED, 2010) .

Outdoor storage areas were problematic. Almost half were directly connected to storm drains, and over half exhibited staining and were in generally poor condition. On the positive side, over 70% of sites observed with outside storage had both secondary containment and/or a cover. Similar results were reported for waste management on sites. Both outdoor storage and waste management can be associated with any of the above surveyed land uses.

The age of building did not appear to be a significant problem. Parking lots did present issues in that buildings frequently (75%) discharged to them. Thirty-three percent of the parking lots were directly connected to storm drains. Again, any of the above land uses can be associated with any of the above surveyed land uses.

The turf and landscaped areas for the surveyed sites could be characterized as 'limited' with only seven sites having some sort of landscaping. Furthermore, none of the sites had any storm water treatment practices present. This indicates that the majority of land uses surveyed could benefit from landscape improvements that could also function as storm water infrastructure.

It should be noted that only 18% of the survey sites were deemed to be 'Not a Hot Spot'.

## ***Recommendations***

The following recommendations stem from the Hot Spot Inventory survey:

- 1) Implementing an education initiative targeted at commercial/retail, and industrial businesses (it is assumed that the Phase II permit will address the municipal sites). Education should focus on vehicle, material, and waste management and for storm water protection.
- 2) Initiating a beautification program targeted at local business that incorporates storm water management facilities and reduces impervious surfaces.
- 3) Both items 1 and 2 should be priorities by areas in close proximity to connected water features and % impervious surface in the vicinity.

**Figure 24: Outdoor Storage Area**



# Pervious Area Assessment (PAA)

***Pervious Area Assessment***

This chapter summarizes the data collected for the “Pervious Area Assessment” in order to make recommendations for future management. The subtitles in bold-italic correspond with the sections on the PAA field form unless otherwise noted. Many of the results are preceded by their corresponding alpha-numeric number on the field form.

***Parcel Descriptions***

There were seven recreational sites and three institutional sites for a total of ten sites. All were public properties. Three (3) were schools, five were parks, one was the fair grounds and the last (1) was a trail.

Two (2) of the sites were between fifty (50) and sixty (60) acres, two were in the fifteen (15) to twenty (20) acre range and the rest were less than ten (10) acres. They all had foot access, six (6) had vehicle access and four (4) could accommodate heavy equipment.

Eight (8) sites were connected to other pervious areas, two (2) were not. Seven (7) were connected to forests and two (2) to wetlands. The size of the connected sites are generally (7 of 8 sites) under ten (10) acres with only one being over twenty (20) acres.

***Forest***

B1 – Percentage with the following Canopy Coverage:

Open	4 x 100%	2 x 90%	1 x 50%	1 x 10%
Partly Shaded	-	-	-	3 x 10%
Shaded	-	1 x 80%	1 x 50%	-

B2 – The dominant species were Maple, Oak, Elm, Poplar, and Evergreen

B3 – The understory species was not well reported. There was only one response – berries.

B4 – Two sites reported the presence of invasive species, and at three sites it was reported that the surveyors were unsure (unknown).

**Figure 25: Park Structure**



***Forest Impacts***

C1 – The following are observed impacts to forested areas:

Clearing/encroachment	2 sites
Trash/dumping	0
Stormwater runoff	0

***Notes for Forest:***

A general observation was that there is an opportunity to plant trees in many of the open areas.

***Wetlands***

B1 – Both wetlands were 100% emergent.

# Pervious Area Assessment (PAA)

B2 – Dominant species was cattails

B3 – One wetland had phragmites present in less than five percent (5%) of the site.

*Notes for Wetlands:*

Connectivity of wetland with other wetlands and forested areas could have been improved on 2 sites (1 forested, 1 wetland)

**Initial Recommendation**

The following were initial recommendation for the surveyed sites:

Good candidate for conservations/protection	2 sites
Potential restoration candidate	2 sites
Poor restoration or conservation candidate	2 sites
Not reported	4 sites

**Current Vegetative Cover**

A1 – Percentage of assessed surface with:

Turf	6 x 80%-90%	3 x 60%-79%	1 x 10%	-
Bare Soil	-	-	1 x 10%	4 x 5%
Trees	1 x 90%	-	4 x 10% - 15%	1 x 5%
Other*	-	3 x 20% - 30%	4 x 10%	-

(\* Mostly gravel/cement, 1 pond, 1 mulch)

A2 – Turf Management

Height	1 x 4 in.	1 x 3 in.	5 x 2 in.	1 x 1 in.
Apparent Mowing Frequency	7 x frequent	2 x infrequent	-	-
Condition	3 x continuous cover	4 x thick/dense	1 x thin/sparse	

A3 – Thickness of Organic Matter at surface

Thickness	1 x 3 in	4 x 2 in.	1 x 1 in.	4 x ½ in.
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A4 – Are invasive species present?

Yes	2x	Unknown	8x
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One site had invasive species at less then 5% of the site (Phragmites), the other site they were present over approximately 25% of the site (Creeping Charlie).

**Impacts**

B1 – The following are observed impacts at the sites:

Soil Compaction	7 sites
Erosion	4 sites
Poor Vegetation	3 sites

**Figure 26: Parking Lot**



# Pervious Area Assessment (PAA)

## ***Reforestation Constraints***

C1 – Sun Exposure	7 x Full Sun	2 x Partial Sun	1 x Shade
C2 – Nearby water source	6 x Yes	2 x No	-
C3 – Other Constraints			
Overhead wires	4 sites		
Underground Utility	1 site		
Pavement	7 sites		
Buildings	6 sites		
Other	1 Athletic Field, 1 playground, 1 Trail		

## ***Initial Recommendation***

Good Candidate for natural regeneration	1 site
May be reforested with minimal site preparation	4 sites
May be reforested with extensive site preparation	0
Poor reforestation or regeneration site	4 sites
Unreported	1 site

## ***Extrapolation to the entire Watershed***

There are the following number and percent of each of these land uses in the Macomb county portion of the watershed:

**Table 18: PAA Extrapolation Land Use Estimates**

<b>Land Use</b>	<b>Number</b>	<b>Percent</b>	<b>Estimated Acres</b>
Parks	130	6.0	12,000
Trails			50 miles
Golf Courses (Public, 125 ac ea.)	40	2.5	5,000
Education Institutions & Libraries	88	2.3	4,600
Government	83	2.1	4,200
Heath Services	133	3.4	6,800
<b>Total Watershed</b>	<b>475</b>	<b>16.3</b>	<b>32,600</b>
<b>Good Restoration Opportunities (1/2)</b>	<b>237</b>	<b>8</b>	<b>16,300</b>

The PAA results yielded that half of the sites surveyed were either good candidates for restoration or required minimal preparation before restoration can occur. If the land use categories surveyed in the PAA are extrapolated to the entire watershed the represent slightly over 16% of the land area.

The PAA results indicated that there are three key restoration activities:

- 1) Plant more trees strategically to manage runoff and connect habitat patches;
- 2) Increase habitat connectivity; and
- 3) Wetlands need to be given particular consideration due to their under representation throughout the watershed and lack of apparent lack of diversity both within individual sites and among sites.

It should be noted that based on the extrapolation of available public land uses for restoration opportunities only represents approximately 8% of the watershed. Based on this estimate it is unlikely that a sustainable watershed wide habitat restoration can be implanted using just public lands.

# Pervious Area Assessment (PAA)

## ***Recommendations***

All too often green infrastructure plans are written from the perspective of the amenities that can be provided to local residence. Although recreational amenities are an important consideration they need to be balanced with other habitat requirements across the watershed. Therefore:

- 1) Create a watershed-wide landscape restoration plan whose goal is the long-term sustainability of habitat. The Michigan Natural Features Inventory and the recently completed MDEQ Potential Wetland inventory both provide a good foundation from which to build.

**Figure 27: Overhead wires as a constraint**



**Figure 28: Lack of Containment on a Connected Impervious Surface**



# Street and Storm Drain Assessment (SSD)

## ***Street and Storm Drain Assessment***

This chapter summarizes the data collected for the “Street and Storm Drain Assessment” in order to make recommendations for future management. The subtitles in bold-italic correspond with the sections on the SSD field form unless otherwise noted. Many of the results are preceded by their corresponding alpha-numeric number on the field form.

### ***Locations***

There were a total of fifty-six (56) observations, fourteen (14) of which were for two sides of the same road. Therefore there were forty-two (42) total sites. In terms of adjacent land uses the breakdown is as follows:

**Table 19: Adjacent Land Uses**

		Frequency
Valid	Agricultural	2
	Commercial	12
	Industrial	2
	Municipal	3
	Residential	36
	Transport-Related	1
	<b>Total</b>	<b>56</b>

**Figure 29: Sediment and Pollutant Source**



It had rained within the last 24 hours for seven (7) of the sites.

### ***Street Condition***

B1 – The following is a breakdown of street types surveyed:

**Table 20: Road Type**

		Frequency
Valid	Alley	3
	Arterial	3
	Collector	12
	Local	16
	Other	1
	Missing	7
	<b>Total</b>	<b>42</b>

**Figure 30: Typical Suburban Streetscape**



# Street and Storm Drain Assessment (SSD)

## B2 – Pavement Conditions

**Table 21: Condition of Pavement by Road Type**

		Broken	Cracked	Good	New	Total
RD TYPE	Alley	1	1	2	0	4
	Arterial	0	0	3	0	3
	Collector	3	3	8	1	15
	Local	7	10	5	1	23
	Other	1	1	0	0	2
	Total	12	15	18	2	47

Local roads exhibited the greatest incident of disrepair (broken and/or cracked). The observed collector roads were in the best repair.

## B3 – On the street parking

**Table 22: On street parking by Road Type**

		No	Yes	Total
RD TYPE	Alley	2	1	3
	Arterial	3	0	3
	Collector	8	4	12
	Local	2	13	15
	Other	0	1	1
	Missing			8
	Total	15	19	42

## B4 – Are larger cul-de-sacs present?

Only five sites reported cul-de-sacs. All were residential streets.

## B5 – Trash in the Gutter

**Table 23: Trash in the Gutters**

	Clean				Filthy	
	1	2	3	4	5	Total
Sediment	8	6	3	0	4	21
Organic Matter	9	7	4	0	2	22
Litter	13	6	2	0	1	22
Total	30	19	9	0	7	65

Over half the streets were in either clean or very clean. Only about 10% were considered very dirty.

## *Storm Drain Inlets and Catch Basins*

### C1 – Type of drain conveyance

- 22 were closed, 9 open and 1 mixed

### C2 – Percentage of inlets with catch basins

100% of the inlets observed had catch basins

# Street and Storm Drain Assessment (SSD)

C3 – Conditions

**Table 24: Catch Basin Observations**

Observations	Count	Percent	Count	Percent	Missing	Total
Current Conditions	4 dry	9	41 wet	91	-	45
Conditions of Inlet	33 clear	73	10 obstructed	22	2	45
Litter Accumulation	31 no	47	14 yes	31	-	45
Organic Accumulation	17 no	28	28 yes	62	-	45
Sediment Accumulation	30 no	67	15 yes	33	-	45
Sediment Depth	4x.6 in.	-	1x2 in.	-	40	45
Oil & Grease Evidence	44 no	98	1	2	-	45
Sulfur Smell	45 no	100	-	-	-	45
Access to Vacuum Truck	2 no	4	41 yes	91	2	45

The most apparent problems observed was that organic matter accumulated at 62% of the sites. Litter and sediment accumulation were also observed to be an issue at 31% and 33% of the sites respectively. Almost all sites have access for a vacuum truck.

### *Municipal Pollutant Reduction Strategies*

E1 - Degree of Pollutant accumulation in the system

Several storm drains can be on one street. Therefore, the number of observations reported in Table 2.5 is not dependent upon the previous totals.

**Table 25: Degree of Pollutant Accumulation**

Rating	Frequency
High	3
Low	14
Medium	5
Total	22

**Figure 31: Street Debris**



E2. Feasibility of Pollutant Prevention Strategies

Three pollution prevention strategies were considered, street sweeping, storm drain stenciling, and catch-basin cleaning out.

Thirty-one (31) sites had a high potential for implementing one or more of these strategies, while three (3) had low potential.

### *Additional information from the Notes*

- Only two of the sites had storm drains stenciled.
- Six sites were specifically recommended for bioswales.
- Sedimentation at two sites was due to new construction.
- Three sites were specifically recommended for street sweeping. (All arterials)
- One site was specifically recommended for catch-basin cleaning. (arterial)

# Street and Storm Drain Assessment (SSD)

## ***Extrapolation***

According to the Road Commission of Macomb County’s 2003 – 2004 statistics, there are 1,174 county primary and 678 state trunk-line lane miles within Macomb County. The watershed land use for ‘Transportation, Communications and Utilities’ accounts for some 665 acres and although this category includes communication and utilities it does give some ideas as a percentage land use in the watershed attributed to roads. Table 26 reflects the total miles of road for Macomb County and the estimated total miles in the watershed.

**Table 26: Macomb County and NBCR estimated road miles**

Functional Classification	Estimated Miles*	Watershed Estimates**
State Trunkline	276	138
County Primary	488	244
County Local	1219	610
City Major	309	77
City Minor	1115	279
Undefined	563	282
<b>Totals</b>	<b>3970</b>	<b>1630</b>
<i>*Source: Road Commission of Macomb County</i>		
<i>**NBCR is approximately ½ of Macomb County and primarily in rural areas. Therefore the City categories are only ¼ (25%) of the total ‘Estimated Miles’. Other categories are estimated at 50% of the ‘Estimated Miles’.</i>		

## ***Recommendations***

Based on the survey results the following actions are recommended:

- 1) Prioritize street sweeping and catch basin cleaning on State Trunklines, County Primary, and City Major roads (total of 459 miles) so the most heavily used receive additional cleanings.
- 2) Expand education on stormwater, especially the stenciling program in residential neighborhoods.
- 3) Continue to enforce the SESC requirements for new construction.

**Figure 32: Street Sweeper**





*Appendix: Assessment Results*

**Neighborhood Source Assessment Results  
Summer/Fall 2009**

SITE_ID	NEIGHBNAME	WATERSHED	SUBWATERSH	DATE_	NEIGHSIZE	ADDRESS_SU	HOMEOWNERS	RESIDTYPE	RESIDSIZE
R-4		Clinton River	NBCR	7/8/2009		Bailey/N. of Dickinson - Hollister	Unknown	SF Detached	
R-6	Romeo Mobile Manor	Clinton River	NBCR	7/8/2009	17	Clinton (N. of Dickinson, S. of Ewell	No	Mobile Home	
R-7	Romeo Town Square	Clinton River	NBCR	7/8/2009	15	N. of Ewell	Yes	Multifamily	
R-8	Whispering Pines	Clinton River	NBCR	7/8/2009	12	Mentz	Yes	SF Detached	
MN-1	Wolverine Country Club Estates	Clinton River	NBCR	7/13/2009	145	Palmer Drive	Yes	SF Detached	
MN-3	Strathmore	Clinton River	NBCR	7/13/2009	32	Brighton	Unknown	SF Detached	
MN-5	Country Club Village of the North	Clinton River	NBCR	7/13/2009	80	Country Club	Unknown	SF Detached	
MS-1	Sycamore Estates	Clinton River	NBCR	7/13/2009	42	Michaywe	Yes	SF Detached	
MS-4	Woodbury Estates	Clinton River	NBCR	7/13/2009	119	Marlburg Way	Yes	SF Detached	
MS-6	Burning Tree Estates	Clinton River	NBCR	7/13/2009	11	Bay Hill	Yes	SF Detached	
MS-10	Creekside	Clinton River	NBCR	7/13/2009	16.5	Current	Yes	SF Detached	
MS-12	Westbrook	Clinton River	NBCR	7/13/2009	75	Catalpa	Yes	Mobile Home	
L-1	Leonard Estates	Clinton River	NBCR	7/14/2009		Rosy	Unknown	SF Detached	
B-1	Unknown	Clinton River	NBCR	7/14/2009		Church Street - E.	No	SF Detached	
A-1	Armada Meadows Sub. #2	Clinton River	NBCR	7/7/2009	15	Jefferson Lane	Unknown	SF Detached	
A-2	Assessor's Plat #3	Clinton River	NBCR	7/7/2009	10+	Spencer	No	SF Detached	
A-11	Armada Meadows	Clinton River	NBCR	7/7/2009	10.57	Franklin & Colonial	No	SF Detached	
A-15	Windmill Point	Clinton River	NBCR	7/7/2009	10		No	Multifamily	
Allen-3	Unknown	Clinton River	NBCR	7/14/2009		Helen Drive	No	SF Detached	
Alm-1	Unknown	Clinton River	NBCR	7/14/2009		Eastridge Drive	Yes	Multifamily	
Alm-4	Kingsbrook Mobile Home Estates	Clinton River	NBCR	7/14/2009	30	Canterbury Lane	Yes	Mobile Home	
Alm-7	Unknown	Clinton River	NBCR	7/14/2009	10	St. Clair N.	No	SF Detached	
C-1	The Harbors	Clinton River	NBCR	7/17/2009	135	Hall Road	No	Multifamily	
C-6	Silver Springs	Clinton River	NBCR	1/7/1900			Yes	Mobile Home	

## Neighborhood Source Assessment Results Summer/Fall 2009

SITE_ID	NEIGHBNAME	ESTIMATAGE	GARAGES	BASEM	SEWER_SERV	INFILL_RED	B1_IC	B2_GRASS	B3_LANDSC	B4_BARE	B5_FOREST	B6_IRRIGAT
R-4		140	100	100	Yes	None	40	40	15	<5	80	<5
R-6	Romeo Mobile Manor	50+	0	0	Yes	None	80	10	5	5	50	0
R-7	Romeo Town Square	10			Yes	None	50	35	10	<5	5	100
R-8	Whispering Pines	19	100	100	Yes	None	45	45	10	0	25	80
MN-1	Wolverine Country Club Estates	3	100	100	Yes		65	20	5	10	<5	100
MN-3	Strathmore	5	100	100	Yes		60	35	5	0	<5	100
MN-5	Country Club Village of the North	10	100	100	Yes	None	60	30	10	0	10	100
MS-1	Sycamore Estates	3	100	100	Yes	None	70	20	10	0	<5	75
MS-4	Woodbury Estates		100	100	Yes	< 5%	70	20	10	0	30	90
MS-6	Burning Tree Estates	10	100	100	Yes	None	70	20	10	0	30	100
MS-10	Creekside	10-12	100	100	Yes	None	70	25	5	0	15	100
MS-12	Westbrook	10-15	80	0	Yes	None	85	10	5		<5	100
L-1	Leonard Estates		100		No	None	<5	85	<5		15	5
B-1	Unknown	100+	100	100	No	None	30	60	<5	<5	75	0
A-1	Armada Meadows Sub. #2	10	100	100	Yes	None	30	55	10	<5	<5	40
A-2	Assessor's Plat #3	100+	50	70	Yes	>10%	25	60	<5	10		0
A-11	Armada Meadows	45	100	100	Yes	None	30	55	10	<5	15	0
A-15	Windmill Point	30+			Yes	None	70	15	10	<5	40	0
Allen-3	Unknown	60	90	10	No	< 5%	35	55	5	5	30	0
Alm-1	Unknown	5	100	0	Yes	None	55	35	5	<5	20	100
Alm-4	Kingsbrook Mobile Home Estates	50	0	0	Yes	< 5%	80	10	<5	<5	30	0
Alm-7	Unknown	100+	100	65	Y	< 5%	35	50	10	<5	75	0
C-1	The Harbors	15	0	0	Yes		60	30	10	5	<5	
C-6	Silver Springs	10	0	0	Yes	< 5%	75	15	10	<5	30	<5

**Neighborhood Source Assessment Results  
Summer/Fall 2009**

SITE_ID	NEIGHBNAME	B7_PROPORT	HIGH	MED	LOW	B8_POOLS	_POOLS	B9_JUNK	_JUNK	C1_DRIVE	C2_CONDITI	C3_SIDEWAL	CONDITION_	DISTANCE_B
R-4			5	90	5	Yes	1	Yes	<5	100	Breaking Up	Yes 2 sides	Lawn Clip Irrigation	4-6 feet
R-6	Romeo Mobile Manor				100	Yes	3	Yes	40	100	Stained Dirty Breaking Up	No		
R-7	Romeo Town Square		100			No		No		100	Stained	Yes 1 side	Irrigation	0
R-8	Whispering Pines		80	20		Yes		No		100	Stained Breaking Up	Yes 2 sides	Irrigation	9 feet
MN-1	Wolverine Country Club Estates		75		25	Yes	<15	Yes		100	Clean	Yes 2 sides	Irrigation	8 feet
MN-3	Strathmore		90	10		Yes	<10	Yes	<5	100	Clean	Yes 2 sides	Irrigation	8 feet
MN-5	Country Club Village of the North		95	5		Yes	<20	No		100	Clean	Yes 2 sides	Irrigation	15 feet
MS-1	Sycamore Estates		95	5		Yes	<10	No		100	Clean	Yes 2 sides	Spotless Irrigation	8 feet
MS-4	Woodbury Estates		90	10		Yes	<10	No		100	Clean	Yes 2 sides	Irrigation	8 feet
MS-6	Burning Tree Estates		100			Yes	<10	No		100	Clean	Yes 2 sides	Irrigation	8 feet
MS-10	Creekside		90	10		Yes	<15	No		100	Clean	Yes 2 sides		8 feet
MS-12	Westbrook		65	30	5	No		No		100	Stained	No		
L-1	Leonard Estates		5	45	50	Yes	2	No		80	Clean	No		
B-1	Unknown				100	No		No		5	Clean	No		
A-1	Armada Meadows Sub. #2		45	50	5	Yes	<5	No		100	Clean	Yes 2 sides	Lawn Clip Irrigation	8 feet
A-2	Assessor's Plat #3				100	Yes	<10	Yes	15	25	Stained Breaking Up	Yes 2 sides	Lawn Clip	12 feet
A-11	Armada Meadows			95	5	Yes	<5	No		0	Stained	Yes 2 sides		10 feet
A-15	Windmill Point			100		No		No		100	Stained Dirty Breaking Up	Yes 1 side		<1
Allen-3	Unknown			30	70	No		Yes	20	40	Clean	No		
Alm-1	Unknown		100			No		No		100	Clean	Yes 2 sides	Irrigation	4 feet
Alm-4	Kingsbrook Mobile Home Estates		40	50	10	No		No		90	Stained Breaking Up	Yes 2 sides		0 feet
Alm-7	Unknown		20	70	10	No		No		90	Stained Breaking Up	Yes 2 sides	Lawn Clip	5 feet
C-1	The Harbors			95	5	No		No			Breaking Up	Yes 2 sides	Spotless	0 feet
C-6	Silver Springs			6		No		No		100	Stained Breaking Up	No		

**Neighborhood Source Assessment Results  
Summer/Fall 2009**

SITE_ID	NEIGHBNAME	PET_WASTE_	C4_CURB_AN	C4CONDITI	D1_DIRECT	D2_IC	D3_PERVIUO	D4_BARREL	D5_LAWN_AR	PERCENT_LA	E1_STORMDR
R-4		No	sediment	Dirty	0	0	100	0	No		Yes
R-6	Romeo Mobile Manor				None						Yes
R-7	Romeo Town Square	No	Clean&dry		40		60		Yes		Yes
R-8	Whispering Pines		sediment		40		60		Yes		Yes
		No	organic matter								
			trash								
			tree canopy								
MN-1	Wolverine Country Club Estates	No	sediment		40		60		Yes		Yes
			trash								
MN-3	Strathmore	No	flowing water		25		75		Yes		Yes
			trash								
MN-5	Country Club Village of the North	No	flowing water		30		70		Yes	30	Yes
			organic matter								
			tree canopy								
MS-1	Sycamore Estates	No	Clean&dry		40	60			Yes	40	Yes
MS-4	Woodbury Estates	No	Clean&dry		80		20		Yes	80	Yes
			tree canopy								
MS-6	Burning Tree Estates	Yes	sediment	Dirty	80		20		Yes	80	Yes
			organic matter								
			tree canopy								
MS-10	Creekside	No	organic matter		10		90		Yes	10	Yes
MS-12	Westbrook		flowing water				100		No		Yes
L-1	Leonard Estates		Clean&dry		0	0	100	0	No		No
B-1	Unknown				0	0	100	0	No		No
A-1	Armada Meadows Sub. #2	No	Clean&dry		0	25	75	0	Yes		Yes
A-2	Assessor's Plat #3	No			0	30	70	0	No		Yes
A-11	Armada Meadows	No			1	70	29	0	Yes		No
A-15	Windmill Point	No						100	Yes		No
Allen-3	Unknown				5		95		No		No
Alm-1	Unknown	No (geese)	Clean&dry		0	0	100	0	No		Yes
			organic matter								
Alm-4	Kingsbrook Mobile Home Estates	No	organic matter				100		No		Yes
Alm-7	Unknown	No	organic matter				100		No		Yes
C-1	The Harbors	No (geese)	Clean&dry				100	0	No		Yes
			sediment								
C-6	Silver Springs	No	Clean&dry						No		Yes

**Neighborhood Source Assessment Results  
Summer/Fall 2009**

SITE_ID	NEIGHBNAME	STENCILED	CONDITION1	CATCH_BASI	E2_SWPOND	POND_TYPE	OVERGROWN	PONDAREA	E3_OPEN_SP	PET_WASTE1	DUMPING
R-4		No	Clean	No	No				No		
R-6	Romeo Mobile Manor	No	<5	No	No				No		
R-7	Romeo Town Square	No	<5	No	No				Yes	No	No
R-8	Whispering Pines	No	Clean	Yes	Yes	Wet	No	1 acre	No		
MN-1	Wolverine Country Club Estates	No	Dirty	Yes (MN-2)	No				No	No	
MN-3	Strathmore	Yes		Yes (MN-4)	No				No		
MN-5	Country Club Village of the North	No	Clean	Yes (MN-6)	Yes	Wet	No	1 acre			
MS-1	Sycamore Estates	Yes	Clean	Yes (MS-2)	No				No		
MS-4	Woodbury Estates	No	Clean	Yes (MS-5)	Yes	Wet	No	> 1 acre	No		
MS-6	Burning Tree Estates	No	Dirty	Yes (MS-7)	No				No		
MS-10	Creekside	No	Clean	Yes (MS-11)	No				No		
MS-12	Westbrook	No		No	No				No		
L-1	Leonard Estates				Yes	Dry	Yes	> 1 acre	No		
B-1	Unknown				No						
A-1	Armada Meadows Sub. #2	No	Clean	No	No				No		
A-2	Assessor's Plat #3	No	Dirty	Yes (A-3)	No				No		
A-11	Armada Meadows			Yes (A-12)	No				No		
A-15	Windmill Point				No				Yes	No	No
Allen-3	Unknown				No				No		
Alm-1	Unknown	No	Clean	Yes (Alm-2)	Yes	Wet	Yes	< 1 acre	No		
Alm-4	Kingsbrook Mobile Home Estates	No	Dirty	Yes (Alm-5)	No				Yes	No	No
Alm-7	Unknown	No	Dirty	Yes (Alm-8)	No				No		
C-1	The Harbors	No	Clean	No	Yes	Wet	No		Yes	No (Geese)	No
C-6	Silver Springs	No	Clean	Yes	No				Yes	No	No

**Neighborhood Source Assessment Results  
Summer/Fall 2009**

SITE_ID	NEIGHBNAME	BUFFERS_FL	ENCROACHME	INDICATORS	NUTRIENTS	OIL_GREASE	TRASH	BACTERIA	SEDIMENT	OTHER	ONSITE_RET	BETTER_LAW
R-4									X			
R-6	Romeo Mobile Manor				X	X	X	X				X
R-7	Romeo Town Square	No										
R-8	Whispering Pines				X			X				X
MN-1	Wolverine Country Club Estates						X		X			X
MN-3	Strathmore											X
MN-5	Country Club Village of the North											
MS-1	Sycamore Estates											X
MS-4	Woodbury Estates											X
MS-6	Burning Tree Estates											X
MS-10	Creekside				X							
MS-12	Westbrook											X
L-1	Leonard Estates											X
B-1	Unknown											
A-1	Armada Meadows Sub. #2	No			X							X
A-2	Assessor's Plat #3								X			X
A-11	Armada Meadows								X			X
A-15	Windmill Point	Yes	No									
Allen-3	Unknown						X					
Alm-1	Unknown											X
Alm-4	Kingsbrook Mobile Home Estates	No										
Alm-7	Unknown											X
C-1	The Harbors				X			X	X			X
C-6	Silver Springs											X

**Neighborhood Source Assessment Results  
Summer/Fall 2009**

SITE_ID	NEIGHBNAME	BETTER_MAN	POND_RETRO	MULTI_FAMI	OTHER_ACTI	NSA_POLLUT	REST_INDEX	SHAPE LENG	SHAPE_LE_1	SHAPE_AREA
R-4						Low	Moderate			
R-6	Romeo Mobile Manor				Education	Moderate	Low			
R-7	Romeo Town Square	X				Moderate	Moderate			
R-8	Whispering Pines	X	X			High	High			
MN-1	Wolverine Country Club Estates					High	High			
MN-3	Strathmore					Moderate	Moderate			
MN-5	Country Club Village of the North		X			Moderate	High			
MS-1	Sycamore Estates					Moderate	Moderate			
MS-4	Woodbury Estates		X			Moderate	High			
MS-6	Burning Tree Estates					Moderate	Moderate			
MS-10	Creekside					Moderate	Moderate			
MS-12	Westbrook					Moderate	Moderate			
L-1	Leonard Estates		X			Moderate	Moderate			
B-1	Unknown					Moderate	Low			
A-1	Armada Meadows Sub. #2					Moderate	Moderate			
A-2	Assessor's Plat #3					High	Moderate			
A-11	Armada Meadows				Rain Garden	Moderate	Moderate			
A-15	Windmill Point					Moderate	Low			
Allen-3	Unknown					Moderate	Low			
Alm-1	Unknown					Moderate	Moderate			
Alm-4	Kingsbrook Mobile Home Estates				Pile of Gravel	Moderate	Moderate			
Alm-7	Unknown					Moderate	Moderate			
C-1	The Harbors	X	X			Moderate	Low			
C-6	Silver Springs					Low	Low			

**Neighborhood Source Assessment Results  
Summer/Fall 2009**

SITE_ID	NEIGHBNAME					
R-4						
R-6	Romeo Mobile Manor					
R-7	Romeo Town Square					
R-8	Whispering Pines					
MN-1	Wolverine Country Club Estates					
MN-3	Strathmore					
MN-5	Country Club Village of the North					
MS-1	Sycamore Estates					
MS-4	Woodbury Estates					
MS-6	Burning Tree Estates					
MS-10	Creekside					
MS-12	Westbrook					
L-1	Leonard Estates					
B-1	Unknown	Septic connected & when full, overflows to river				
A-1	Armada Meadows Sub. #2					
A-2	Assessor's Plat #3	No lawn maintenance, needs shoulder restoration.				
A-11	Armada Meadows					
A-15	Windmill Point					
Allen-3	Unknown					
Alm-1	Unknown					
Alm-4	Kingsbrook Mobile Home Estates					
Alm-7	Unknown					
C-1	The Harbors					
C-6	Silver Springs					

### Hotspot Site Investigation Results Summer/Fall 2009

UNIQUE_SIT	NAME_ADDRE	WATERSHED	SUBWATERSH	DATE_	LAT	LONG_	SIC_CODE	NPDES_STAT	CATEGORY	OPERATION
R-3	Car Wash	Clinton River	NBCR	7/8/2009					Commercial	N/A
R-11	Fiddeler's Cove	Clinton River	NBCR	7/8/2009					Commercial	Strip Mall
R-12	Marathon Gas Station	Clinton River	NBCR	7/8/2009					Commercial	Gas Station
R-15	Gates/Prospect	Clinton River	NBCR	7/8/2009					Commercial	Motel
R-16	First Congregational Church	Clinton River	NBCR	7/8/2009					Institutional	Church
MN-7	Landscape Source	Clinton River	NBCR	7/13/2009					Commercial	Landscape Co.
B-2	J & J Auto Repair	Clinton River	NBCR	7/14/2009					Commercial	Auto Repair
B-3	Restaurant & Bar Equipment	Clinton River	NBCR	7/14/2009				Unregulated	Commercial	Rest./Bar Equip.
A-B (Armada)	Armada Road House	Clinton River	NBCR	7/14/2009					Commercial	Restaurant
A-4	Armada Area Schools	Clinton River	NBCR	7/7/09				Unregulated	Municipal Transport-Related	Bus Garage
A-8	South End Car Wash	Clinton River	NBCR	7/7/2009				Unregulated	Commercial	Car Wash
A-9	DPW	Clinton River	NBCR	7/7/2009				Regulated	Municipal	Wastewater Treatment
A-13	Marathon Gas Station	Clinton River	NBCR	7/7/2009				Unregulated	Commercial	Gas Station
A-14	Larry's Automotive	Clinton River	NBCR	7/7/2009					Commercial	Auto Repair & Storage
Allen-2	Berlin Twp. Fire Hall	Clinton River	NBCR	7/14/2009					Municipal	Fire Station
Allen-5	Tire Express	Clinton River	NBCR	7/14/2009				Unregulated	Commercial	Tire & Auto Parts
Alm-3	Food Pride	Clinton River	NBCR	7/14/2009				Unregulated	Commercial	Grocery/Strip Mall
Alm-11	Almont Village DPW	Clinton River	NBCR	7/14/2009				Unregulated	Municipal	DPW
C-2	C.J. Barrymore's	Clinton River	NBCR	7/17/2009					Commercial	Water Park, Go-Karts, Golf
C-5	Macomb Industrial	Clinton River	NBCR	7/17/2009				Unregulated	Commercial Industrial	Seminole Machinery
C-8	County Dunham Road Campus	Clinton River	NBCR	7/17/2009				Regulated	Municipal	F&O, Health, Central Rec.
C-9	B & W Landscape	Clinton River	NBCR	7/17/2009				Unregulated	Commercial	Landscape Business

### Hotspot Site Investigation Results Summer/Fall 2009

UNIQUE_SIT	NAME_ADDRE	B1__TYPES	OTHER	B2_APP_	MAINTAINED	REPAIRED	RECYCLED	FUELED	WASHED	STORED	B4_OUTSIDE
R-3	Car Wash										
R-11	Fiddeler's Cove										
R-12	Marathon Gas Station										
R-15	Gates/Prospect										
R-16	First Congregational Church										
MN-7	Landscape Source										
B-2	J & J Auto Repair		X	Varies	X	X				X	Yes
B-3	Restaurant & Bar Equipment										
A-B (Armada)	Armada Road House										
A-4	Armada Area Schools	School		20	X	X		X	X	X	Yes
A-8	South End Car Wash										
A-9	DPW	Other	Sweeper	3						X	Yes
A-13	Marathon Gas Station										
A-14	Larry's Automotive		Customer Vehicles	15	X	X				X	Yes
Allen-2	Berlin Twp. Fire Hall	Fleet		9	X	X		X	X	X	No
Allen-5	Tire Express										
Alm-3	Food Pride										
Alm-11	Almont Village DPW	Fleet		8	X						
C-2	C.J. Barrymore's										
C-5	Macomb Industrial										
C-8	County Dunham Road Campus	Fleet		10	X			X	X	X	No
C-9	B & W Landscape			5	X					X	Can't Tell

### Hotspot Site Investigation Results Summer/Fall 2009

UNIQUE_SIT	NAME_ADDRE	RUNOFF_DIV	B5_SPILLS	B6FUEL_UNC	B7FUEL_SD	B8OD_WASH	WASH_SD	C1_LOADING	UNCOVERED_	C2STORAGE	TYPE
R-3	Car Wash										
R-11	Fiddeler's Cove							Yes		Yes	Liquid
R-12	Marathon Gas Station							No		Yes	Liquid Solid
R-15	Gates/Prospect							No		Yes	Liquid Solid
R-16	First Congregational Church							No		No	
MN-7	Landscape Source							Yes	Can't Tell	Yes	Liquid Solid
B-2	J & J Auto Repair	Yes	Yes	No	No	Can't Tell		No		No	
B-3	Restaurant & Bar Equipment							Yes		Yes	
A-B (Armada)	Armada Road House							Yes	Can't Tell	Yes	Liquid Solid
A-4	Armada Area Schools	Yes	No	Yes	Yes	No	Can't Tell	No		Yes	Solid
A-8	South End Car Wash										
A-9	DPW	Yes	Yes	Yes	No	Can't Tell		Can't Tell		Yes	
A-13	Marathon Gas Station							No	Yes	Yes	Liquid Solid
A-14	Larry's Automotive	Yes	Yes	No	No	No		Yes		Yes	Liquid
Allen-2	Berlin Twp. Fire Hall	Can't Tell	No	Yes	No	Yes	No	No		Yes	Liquid
Allen-5	Tire Express							Yes		Yes	
Alm-3	Food Pride							Yes		Yes	
Alm-11	Almont Village DPW	No		Yes	No	Can't Tell		Yes		Yes	
C-2	C.J. Barrymore's							Yes	No	Yes	Liquid
C-5	Macomb Industrial							No		Yes	Liquid Solid
C-8	County Dunham Road Campus	Yes	Yes	Yes		Can't Tell		Yes	Yes	Yes	Liquid Solid
C-9	B & W Landscape	Yes	Can't Tell	Can't Tell	Can't Tell	Can't Tell	Can't Tell	Yes	Yes	Yes	Solid

### Hotspot Site Investigation Results Summer/Fall 2009

UNIQUE_SIT	NAME_ADDRE	DESCRIBE	STORE_SITE	C3STORE_SD	C4STAINING	C5NOCOVER	C6_LIQUID_	C7STORELAB	WASTE_TYPE	D2DUMPSTER
R-3	Car Wash								Garbage	
R-11	Fiddeler's Cove	Grease	Concrete/asphalt	Yes	Yes	Yes	No		Garbage	
R-12	Marathon Gas Station		Concrete/asphalt	No	Yes	No	Yes	Yes	Garbage	
R-15	Gates/Prospect		Concrete/asphalt	Yes	No	Yes	Yes	Can't Tell	Garbage Hazardous	No Dumpster
R-16	First Congregational Church			No	No	No	Yes		Garbage	
MN-7	Landscape Source		Grass/dirt	Yes		Yes	Yes	Yes	Garbage Construction	
B-2	J & J Auto Repair			No	Yes	No	No	No		
B-3	Restaurant & Bar Equipment		Grass/dirt	No	Can't Tell	Yes	Yes	Yes	Garbage Construction	
A-B (Armada)	Armada Road House		Concrete/asphalt	No	Yes	Yes	Yes	Yes	Garbage	
A-4	Armada Area Schools		Grass/dirt Concrete/asphalt	Yes	No	Yes	No	Yes	Garbage Construction	
A-8	South End Car Wash								Garbage	
A-9	DPW		Grass/Dirt	No	No	Yes	No	No	Garbage Construction	
A-13	Marathon Gas Station		Concrete/asphalt	Yes	No	Yes	Yes	No	Garbage	
A-14	Larry's Automotive		Concrete/asphalt	No	Yes	Yes	Yes	No		
Allen-2	Berlin Twp. Fire Hall		Concrete/asphalt	No	Yes	Yes	Yes	No	Garbage	
Allen-5	Tire Express		Grass/dirt	No	Yes	Yes	No	Yes	Garbage	
Alm-3	Food Pride		Grass/dirt	Yes	Yes	Yes	Yes	Yes	Garbage	
Alm-11	Almont Village DPW		Grass/Dirt	No	Yes	Yes	Yes	No	Garbage Construction	
C-2	C.J. Barrymore's		Concrete/asphalt	Can't Tell	No	Yes	Yes	No	Garbage	
C-5	Macomb Industrial	Machine Pts.	Concrete/asphalt	Yes	Yes	Yes	Yes	Yes	Garbage Construction	
C-8	County Dunham Road Campus		Concrete/asphalt	Yes	Yes	Yes	Yes	Yes	Garbage Hazardous	
C-9	B & W Landscape		Grass/dirt Concrete/asphalt	Yes	Yes	Yes	Can't Tell	Can't Tell	Construction	

### Hotspot Site Investigation Results Summer/Fall 2009

UNIQUE_SIT	NAME_ADDRE	NO_COVER	DAMAGED	LEAKING	OVERFLOW	D3_DUMP_SD	RUNOFFDIV	E1BUILDAGE	CONDITION_	EVIDENCE	E2_PARKING
R-3	Car Wash					No		40	Stained Dirty	#VALUE!	40
R-11	Fiddeler's Cove	X	X			Yes	Yes	15	Stained	#VALUE!	15
R-12	Marathon Gas Station					No		50	Clean	#VALUE!	
R-15	Gates/Prospect							40	Stained Dirty		40
R-16	First Congregational Church		X					181	Clean		10
MN-7	Landscape Source	X	X			No		40	Dirty	#VALUE!	40
B-2	J & J Auto Repair							50	Clean		
B-3	Restaurant & Bar Equipment	X				No			Stained		
A-B (Armada)	Armada Road House	X				No		100+	Stained		10
A-4	Armada Area Schools					No		20	Damaged		20
A-8	South End Car Wash					No		10	Stained		10
A-9	DPW		X			No		20	Stained		20
A-13	Marathon Gas Station		X			No		20	Clean		20
A-14	Larry's Automotive							50+	Stained Dirty		20+
Allen-2	Berlin Twp. Fire Hall					No		10	Clean		10
Allen-5	Tire Express							15	Stained		20
Alm-3	Food Pride	X		X	X	No		30	Stained		30
Alm-11	Almont Village DPW	X						20	Clean		
C-2	C.J. Barrymore's	X	X			No		15-25	Clean		5
C-5	Macomb Industrial			X		Yes	Yes	25	Clean		25
C-8	County Dunham Road Campus	X	X			Yes	No	40	Clean		20
C-9	B & W Landscape							20	Clean		15

### Hotspot Site Investigation Results Summer/Fall 2009

UNIQUE_SIT	NAME_ADDRE	CONDITION1	SURFACE_MA	E3_DOWNSPO	CONNECT_SD	E4BADCLEAN	FOREST_	TURF_	LANDSCAPE_	BARE_SOIL_
R-3	Car Wash	Stained	Paved/Concrete	No	Yes	No	N/A			
		Dirty								
		Damaged								
R-11	Fiddeler's Cove	Stained	Paved/Concrete	Yes	No					
		Dirty								
		Damaged								
R-12	Marathon Gas Station	Stained	Paved/Concrete	No						
		Dirty								
		Damaged								
R-15	Gates/Prospect	Stained	Paved/Concrete	Yes	Yes					
		Dirty								
		Damaged								
R-16	First Congregational Church	Clean	Paved/Concrete	Yes	Yes		15	70	10	5
MN-7	Landscape Source		Gravel	No	No					100
B-2	J & J Auto Repair									
B-3	Restaurant & Bar Equipment			No						
A-B (Armada)	Armada Road House	Stained	Paved/Concrete	Yes	No	No				
		Dirty								
		Damaged								
A-4	Armada Area Schools	Stained	Paved/Concrete	Yes	No	No	0	0	0	10
		Damaged								
A-8	South End Car Wash	Clean	Paved/Concrete	Yes	No	No				
A-9	DPW	Damaged	Paved/Concrete		No	No	5	80	10	5
A-13	Marathon Gas Station	Stained	Paved/Concrete	Yes	Yes	No	10		15	
		Dirty								
A-14	Larry's Automotive	Stained	Paved/Concrete	No		No				
		Dirty								
Allen-2	Berlin Twp. Fire Hall	Damaged	Paved/Concrete	Yes	No	No		10	5	
Allen-5	Tire Express	Stained	Gravel	Yes						
Alm-3	Food Pride	Stained	Paved/Concrete	Yes	Yes					
		Dirty								
Alm-11	Almont Village DPW		Paved/Concrete	No	No	Yes		10		
C-2	C.J. Barrymore's	Clean	Paved/Concrete	None Visible		No	25	45	25	<5
C-5	Macomb Industrial	Stained	Paved/Concrete	Yes		Can't Tell		95	5	
		Dirty								
		Damaged								
C-8	County Dunham Road Campus	Stained	Paved/Concrete	Yes	Yes	No	<5	80	>5	10
		Dirty								
		Damaged								
C-9	B & W Landscape	Clean	Paved/Concrete	Yes	No	Yes				
			Gravel							

### Hotspot Site Investigation Results Summer/Fall 2009

UNIQUE_SIT	NAME_ADDRE	F2TURF_RAT	F3IRRIGATE	F4SCAPE_SD	F5_ORGANIC	G1SW_SITE	SWDESCRIBE	G2_PRIVATE	G2_TRASH_P	SEDIMENT
R-3	Car Wash									
R-11	Fiddeler's Cove					No		Yes		
R-12	Marathon Gas Station									
R-15	Gates/Prospect					No		No		
R-16	First Congregational Church	Medium	No	No	No	No		No		
MN-7	Landscape Source		Yes	Yes	Yes	No		No		
B-2	J & J Auto Repair									
B-3	Restaurant & Bar Equipment									
A-B (Armada)	Armada Road House					No		No		
A-4	Armada Area Schools	Low	No	No	No	No		No		
A-8	South End Car Wash									
A-9	DPW	Medium	No	No	Yes	No		No		1
A-13	Marathon Gas Station	Medium	No	No	No	No		No		1
A-14	Larry's Automotive					No		No		3
Allen-2	Berlin Twp. Fire Hall	Medium	No	No	No	No		No		
Allen-5	Tire Express									
Alm-3	Food Pride					No		Yes		
Alm-11	Almont Village DPW	Medium	No	No	No	No		No		
C-2	C.J. Barrymore's	High	Yes	Yes	Yes	No		Yes		1
C-5	Macomb Industrial	High	Yes	No	Can't Tell	No		Yes		2
C-8	County Dunham Road Campus	Low	No	No	No	No		No		2
C-9	B & W Landscape					No				

### Hotspot Site Investigation Results Summer/Fall 2009

UNIQUE_SIT	NAME_ADDRE	ORGANIC	LITTER	G3CATCHBAS	G3CATCHBASCON	HSI_STATUS	ENFORCE	INSPECTION	ILLCIT_D	EDUCATION
R-3	Car Wash					Not a Hot Spot				X
R-11	Fiddeler's Cove					Confirmed Hot Spot		X		X
R-12	Marathon Gas Station					Severe Hot Spot				X
R-15	Gates/Prospect					Severe Hot Spot				X
R-16	First Congregational Church					Not a Hot Spot				
MN-7	Landscape Source					Severe Hot Spot				X
B-2	J & J Auto Repair									X
B-3	Restaurant & Bar Equipment									X
A-B (Armada)	Armada Road House					Confirmed Hot Spot				X
A-4	Armada Area Schools					Severe Hot Spot				X
A-8	South End Car Wash					Not a Hot Spot				
A-9	DPW	1	1			Confirmed Hot Spot				X
A-13	Marathon Gas Station	1	1			Potential Hot Spot				X
A-14	Larry's Automotive	1	3			Confirmed Hot Spot				X
Allen-2	Berlin Twp. Fire Hall									X
Allen-5	Tire Express					Confirmed Hot Spot				X
Alm-3	Food Pride					Severe Hot Spot				X
Alm-11	Almont Village DPW					Severe Hot Spot				X
C-2	C.J. Barrymore's	1	1			Confirmed Hot Spot				X
C-5	Macomb Industrial	2	2			Potential Hot Spot				X
C-8	County Dunham Road Campus	2	2			Confirmed Hot Spot		X		X
C-9	B & W Landscape			C-10		Confirmed Hot Spot				X

## Hotspot Site Investigation Results Summer/Fall 2009

UNIQUE_SIT	NAME_ADDRE	NPDES_NON_	SITE_RETRO	PERVIOUS_A	SWPPP_REV
R-3	Car Wash				
R-11	Fiddeler's Cove		X		
R-12	Marathon Gas Station				
R-15	Gates/Prospect				
R-16	First Congregational Church				
MN-7	Landscape Source				
B-2	J & J Auto Repair				
B-3	Restaurant & Bar Equipment				
A-B (Armada)	Armada Road House				
A-4	Armada Area Schools				
A-8	South End Car Wash				
A-9	DPW				
A-13	Marathon Gas Station				
A-14	Larry's Automotive				
Allen-2	Berlin Twp. Fire Hall				
Allen-5	Tire Express				
Alm-3	Food Pride				
Alm-11	Almont Village DPW				
C-2	C.J. Barrymore's				
C-5	Macomb Industrial				
C-8	County Dunham Road Campus				
C-9	B & W Landscape				

## Hotspot Site Investigation Results Summer/Fall 2009

UNIQUE_SIT	NAME_ADDRE	NOTES		
R-3	Car Wash	A lot of sediment going into sanitary sewers.		
R-11	Fiddeler's Cove	Catch basins downstream of dumpster had odors/staining. Trash along perimeter. Grease dumpster overflowing.		
R-12	Marathon Gas Station	Possibly refer to Health Dept. for outdoor storage.		
R-15	Gates/Prospect			
R-16	First Congregational Church	Overflow parking area old, cracked asphalt.		
MN-7	Landscape Source			
B-2	J & J Auto Repair			
B-3	Restaurant & Bar Equipment			
A-B (Armada)	Armada Road House			
A-4	Armada Area Schools			
A-8	South End Car Wash			
A-9	DPW			
A-13	Marathon Gas Station			
A-14	Larry's Automotive			
Allen-2	Berlin Twp. Fire Hall			
Allen-5	Tire Express			
Alm-3	Food Pride	Possibly refer to Lapeer Co. Health Dept. for leaking grease dumpster		
Alm-11	Almont Village DPW	Site located next to the NBCR; old rusty material stored outside; sally held into storage bin by snow plow blade.		
C-2	C.J. Barrymore's	Back parking lot broken up, pile of sediment.		
C-5	Macomb Industrial			
C-8	County Dunham Road Campus	Grow zone, parking lot sweeping, replace dumpster by Martha T. Berry, improve storage practices		
C-9	B & W Landscape			

### Hotspot Site Investigation Results Summer/Fall 2009

UNIQUE_SIT	NAME_ADDRE							
R-3	Car Wash							
R-11	Fiddeler's Cove							
R-12	Marathon Gas Station							
R-15	Gates/Prospect							
R-16	First Congregational Church							
MN-7	Landscape Source							
B-2	J & J Auto Repair							
B-3	Restaurant & Bar Equipment							
A-B (Armada)	Armada Road House							
A-4	Armada Area Schools							
A-8	South End Car Wash							
A-9	DPW							
A-13	Marathon Gas Station							
A-14	Larry's Automotive							
Allen-2	Berlin Twp. Fire Hall							
Allen-5	Tire Express							
Alm-3	Food Pride							
Alm-11	Almont Village DPW							
C-2	C.J. Barrymore's							
C-5	Macomb Industrial							
C-8	County Dunham Road Campus							
C-9	B & W Landscape							

**Pervious Area Assessment Results  
Summer/Fall 2009**

UNIQUE_SIT	OWNER_	MGMT_	WATERSHED	SUBWATERSH	DATE_	LAT	LONG_	SIZE_	ACCESS_	OTHER
R-1	Public	School	Clinton River	NBCR	7/8/2009			16	Vehicle	
									Foot	
R-2	Public	Park	Clinton River	NBCR	7/8/2009			0.20	Foot	
									Vehicle	
									Heavy Equip	
R-14	Public	Other	Clinton River	NBCR	7/8/2009				Heavy Equip	Fair Grounds/Baseball Fields
									Foot	
									Vehicle	
MS-9	Private	Park	Clinton River	NBCR	7/13/2009			18	Foot	
L-3	Public		Clinton River	NBCR	7/14/2009			3	Foot	Polly Ann Trail
A-5	Public	School	Clinton River	NBCR	7/7/2009			61	Foot	School
A-7	Public	Park	Clinton River	NBCR	7/7/2009			10	Foot	
									Vehicle	
Allen-1	Public	Park	Clinton River	NBCR	7/14/2009			6	Foot	
									Vehicle	
									Heavy Equip	
Alm-6	Public	School	Clinton River	NBCR	7/14/2009			50	Foot	Almont Elementary
Alm-10	Public	Park	Clinton River	NBCR	7/14/2009			50+	Foot	
									Vehicle	
									Heavy Equip	

## Pervious Area Assessment Results Summer/Fall 2009

UNIQUE_SIT	OWNER_	MGMT_	DESCRIBE	CONNECTED	CONNECTED TO	Other_Descrip	SIZE OF CONNECTED	CONNECTED SITE ID
R-1	Public	School		Yes	Forest		1 acre	
R-2	Public	Park		Yes	Forest		5 acres	
R-14	Public	Other		No				
MS-9	Private	Park		Yes	Forest		3-4 acres	
L-3	Public			Yes	Forest		4 acres	
A-5	Public	School		Yes	Forest		10+	
A-7	Public	Park		No				
Allen-1	Public	Park		Yes		Other	10+ acres	
Alm-6	Public	School		Yes	Forest		10 acres	
Alm-10	Public	Park		Yes	Forest		20+	
					Wetland			

**Pervious Area Assessment Results  
Summer/Fall 2009**

UNIQUE_SIT	OWNER_	MGMT_	B.1 % OPEN	B.1 % SHADED	B.1 %SHADED	B.2 DOM_SPECIES	B.3 UNDER_SPECIES	B.4 INVASIVES?
R-1	Public	School	100					
R-2	Public	Park	10	10	80	Elm		
R-14	Public	Other						
MS-9	Private	Park	100					Yes
L-3	Public		50		50	Unknown		
A-5	Public	School	90	10		Oak, Maple, Elm, Poplar	Berries	No
A-7	Public	Park						
Allen-1	Public	Park	100					Yes
Alm-6	Public	School	100					
Alm-10	Public	Park	90	10		evergreen		

**Pervious Area Assessment Results  
Summer/Fall 2009**

UNIQUE_SIT	OWNER_	MGMT_	% OF INVASIVES	INVASE_SPECIES	C.1 ANIMALS	C.1 CLEARING/ENCROACH	C.1 TRASH	C.1 SW RUNOFF
R-1	Public	School						
R-2	Public	Park	Unknown			X		
R-14	Public	Other						
MS-9	Private	Park					X	
L-3	Public		Unknown					
A-5	Public	School				X		
A-7	Public	Park						
Allen-1	Public	Park	Unknown					
Alm-6	Public	School						
Alm-10	Public	Park	Unknown					

## Pervious Area Assessment Results Summer/Fall 2009

UNIQUE_SIT	OWNER_	MGMT_	C.1 OTHER	NOTES	B.1 Wet %AGA	B.I WET %EMERG
R-1	Public	School				
R-2	Public	Park		Trail goes through -paved. Add grown zones around trail.		
R-14	Public	Other		Fairgrounds Primary Use		
MS-9	Private	Park		Plant trees in park; grow zone; buffer around pond.		100
L-3	Public					
A-5	Public	School				
A-7	Public	Park				
Allen-1	Public	Park				
Alm-6	Public	School		Open lot, playground, baseball field		
Alm-10	Public	Park				100

## Pervious Area Assessment Results Summer/Fall 2009

UNIQUE_SIT	OWNER_	MGMT_	B.1 WET FOREST	B.2 WET DOM_SPECIES	B.3 WET INVASIVES?	% OF INVASIVES	INVASE_SPECIES
R-1	Public	School					
R-2	Public	Park					
R-14	Public	Other					
MS-9	Private	Park		Cattails	Yes	<5	Phragmites
L-3	Public						
A-5	Public	School					
A-7	Public	Park					
Allen-1	Public	Park					
Alm-6	Public	School					
Alm-10	Public	Park		Unknown, cattails	Unknown		

## Pervious Area Assessment Results Summer/Fall 2009

UNIQUE_SIT	OWNER_	MGMT_	NOTES	E. CONSER	A.1 %_TURF	A.1 %_HERB	A.1 %_NONE
R-1	Public	School			80		10
R-2	Public	Park		Conservation	60		
R-14	Public	Other			70		5
MS-9	Private	Park		Restoration	90		
L-3	Public				10		
A-5	Public	School	Dead Ash Trees, red dirt stockpile, athletic fields	Poor Candidate	90		5
A-7	Public	Park	Wetland across street, not connected	Poor Candidate	75		5
Allen-1	Public	Park	Open park for playground, basketball area, pavillion	Restoration	80		
Alm-6	Public	School			90		
Alm-10	Public	Park	Small wetland area by river.	Conservation	80		5

**Pervious Area Assessment Results  
Summer/Fall 2009**

UNIQUE_SIT	OWNER_	MGMT_	A.1 %_TREES	A.1 %_SHRUBS	A.1 %_OTHER	A.1 DISCRIPTION	A.2 HEIGHT	A.2 FREQ
R-1	Public	School			10	mulch	2 inches	Frequent
R-2	Public	Park	10		30	gravel/wood chips		Frequent
R-14	Public	Other			25	gravel	2 inches	Infrequent
MS-9	Private	Park			10	pond	2 inches	Frequent
L-3	Public		90				2 inches	Frequent
A-5	Public	School	5				4 inches	Infrequent
A-7	Public	Park	10		10	Paved basketball ct. & pavillion	3 inches	Frequent
Allen-1	Public	Park			20	cement, pea gravel, gravel driveway	2 inches	Frequent
Alm-6	Public	School			10	pea gravel		
Alm-10	Public	Park	15				1 inch	Frequent

**Pervious Area Assessment Results  
Summer/Fall 2009**

UNIQUE_SIT	OWNER_	MGMT_	A.2 CONDITION	A.3 THICKNESS	A.4 INVASIVES?	A.4 % OF SITE	A.4 INVASIVE_SPECIES	B.1 SOIL_COMP
R-1	Public	School	Thick/Dense	1/2 inch	Unknown			X
R-2	Public	Park		2-3 inches	Unknown	Unknown		X
R-14	Public	Other	Thin/Sparse	1/2 inch	Unknown			X
MS-9	Private	Park	Continuous Cover	2 inches	Yes	<5	Phragmites	
L-3	Public			2 inches	Unknown			X
A-5	Public	School	Thick/Dense	1/2 inch	Unknown			X
A-7	Public	Park	Continuous Cover	1/2 inch	Unknown			X
Allen-1	Public	Park	Thick/Dense	2 inches	Unknown			
Alm-6	Public	School	Thick/Dense	2 inches	Unknown			
Alm-10	Public	Park	Continuous Cover	1 inch	Yes	25	Creeping Charlie	X

## Pervious Area Assessment Results Summer/Fall 2009

UNIQUE_SIT	OWNER_	MGMT_	B.1_EROSION	B.1_TRASH	B.1_P	B.1_POOR_VEG	B.1_OTHER	C.1 SUN	C.2 H2O Source	C.3 WIRES
R-1	Public	School						Full	Yes	X
R-2	Public	Park	X					Partial	Yes	X
R-14	Public	Other	X			X		Full	No	
MS-9	Private	Park						Full	Yes	
L-3	Public							Shade		
A-5	Public	School				X		Full		
A-7	Public	Park	X			X		Partial	No	X
Allen-1	Public	Park						Full	Yes	X
Alm-6	Public	School						Full	Yes	
Alm-10	Public	Park	X					Full	Yes	

## Pervious Area Assessment Results Summer/Fall 2009

UNIQUE_SIT	OWNER_	MGMT_	C.3 UNDER_UTILITY	C.3 PAVE	C.3 BUILD	C.3OTHER
R-1	Public	School		X	X	Playground
R-2	Public	Park				Trail
R-14	Public	Other		X	X	
MS-9	Private	Park				
L-3	Public			X		
A-5	Public	School	X	X	X	Athletic Fields
A-7	Public	Park		X	X	
Allen-1	Public	Park				
Alm-6	Public	School		X	X	
Alm-10	Public	Park		X	X	

## Pervious Area Assessment Results Summer/Fall 2009

UNIQUE_SIT	OWNER_	MGMT_	NOTES	E. OS Rec
R-1	Public	School	Repair bare areas. Primary purpose school playground	Poor Candidate
R-2	Public	Park		Good
R-14	Public	Other	Primary use for fair grounds, baseball during season	Poor Candidate
MS-9	Private	Park		Min Site Prep
L-3	Public		Trail is paved and tree lined	
A-5	Public	School	Lot of weeds	Poor Candidate
A-7	Public	Park	Playground equipment, basketball court	Poor Candidate
Allen-1	Public	Park	Plant trees, grow zones	Min Site Prep
Alm-6	Public	School	Plant trees, grow zones	Min Site Prep
Alm-10	Public	Park	Buffer, grow zones, plant trees, less frequent mowing	Min Site Prep

**Street and Storm Drains Results  
Summer/Fall 2009**

UNIQUE_SIT	STREET_NAME	ADJ_LU	WATERSHED	SUBWATERSH	DATE	ASSESSED BY	CAMERA ID	MAP GRID	RAIN 24 HR	PIC #	HIS/NSA #	B.1 RD TYPE	Other Desc.	PAVE_CON	STREET_PARK	# OF CARS	CUL_DESAC
R-2	Van Dyke	Residential Commercial	Clinton River	NBCR	7/8/2009				No	4-6		Collector		Good	Yes		No
R-5	M-53 Bypass	Residential Commercial	Clinton River	NBCR	7/8/2009				No	13-14		Arterial		Good	No		No
R-9	Mentz	Residential	Clinton River	NBCR	7/8/2009				No	21-22	R-8	Local		Cracked Broken	Yes		Yes
R-13	Alley	Residential Commercial	Clinton River	NBCR	7/8/2009				No	39-41, 43		Alley		Good	No		No
MN-2	Palmer	Residential	Clinton River	NBCR	7/13/2009				No	1-2, 4	MN-1	Local		New	Yes		No
MN-4	Brighton	Residential	Clinton River	NBCR	7/13/2009				No	11-12	MN-3	Local		Good	Yes		No
MN-6	Country Club	Residential	Clinton River	NBCR	7/13/2009				No	15-16	MN-5	Local		Good	Yes		No
MN-8	26 Mile Road	Residential	Clinton River	NBCR	7/13/2009				No	23-29		Collector		Good	No		No
MN-9	26 Mile Road		Clinton River	NBCR	7/13/2009				No	30-31		Collector		Good	No		No
MN-10	25 Mile Raod	Residential	Clinton River	NBCR	7/13/2009				No	32-33		Collector		Good	No		No
MS-2	Michaywe	Residential	Clinton River	NBCR	7/13/2009				No	36-37	MS-1	Local		Good	Yes		No
MS-3	Card Road	Residential	Clinton River	NBCR	7/13/2009				No	38-40		Collector		Good	No		No
MS-5	Malburg Way	Residential	Clinton River	NBCR	7/13/2009				No	44-45	MS-4	Local		Cracked	Yes		Yes
MS-7	Bayhill	Residential	Clinton River	NBCR	7/13/2009				No	53-56	MS-6	Local		Cracked Broken	Yes		Yes
MS-8	Grand Cypress Ct.	Residential	Cinton River	NBCR	7/13/2009				No	57-58	MS-6	Other	Cul-de-Sac	Cracked Broken	Yes		Yes
MS-11	Current	Residential	Clinton River	NBCR	7/13/2009				No	64-65	MS-10	Local		Cracked	Yes		No
L-2	Rosy	Residential	Clinton River	NBCR	7/14/2009				No	68-69	L-1	Local		Good	Yes		Yes
B-4	Hough Road	Residential Commercial	Clinton River	NBCR	7/14/2009				No	11-12	B-3	Local		Good	Yes		No
SA-A	Alley (s. side Main)	Commercial	Clinton River	NBCR	7/14/2009				No	1-5		Alley		Good	Yes		No
A-3	Spencer Street	Residential	Clinton River	NBCR	7/7/2009				No	5,6,7,9	A-2	Local		Cracked Broken	Yes		No
A-6	E. Main Street	Residential Commercial	Clinton River	NBCR	7/7/2009				No	15,16,17,18		Collector		New	Yes		No
A-10	North Avenue	Residential Commercial Industrial Municipal	Clinton River	NBCR	7/7/2009				No	25-28		Collector		Good	No		No
A-12	Franklin	Residential	Clinton River	NBCR	7/7/2009				No	31-34	A-11	Local		Cracked Broken	Yes		No
Allen-4	Capac Road	Residential Commercial	Clinton River	NBCR	7/14/2009				No	21-22		Collector		Good	No		No
Alm-2	East Ridge Drive	Residential	Clinton River	NBCR	7/14/2009				No	28-29	Alm-1	Local		Cracked			No
Alm-5	Canterbury Lane	Residential	Clinton River	NBCR	7/14/2009				No	38	Alm-4	Local		Cracked Broken	Yes		No
Alm-8	St. Clair N.	Residential	Clinton River	NBCR	7/14/2009				No	46	Alm-7	Collector		Cracked Broken	Yes		No
Alm-9	North Main	Commercial	Clinton River	NBCR	7/14/2009				No	47-51		Collector		Good	Yes		No
C-3	Hall Road	Commercial	Clinton River	NBCR	7/17/2009				Yes	15-17	C-2	Arterial		Good	No		No
C-4	Macomb Industrial Drive	Industrial	Clinton River	NBCR	7/17/2009				Yes	21-25	C-5	Local		Cracked Broken	No		No
C-7	Rose Street	Residential Municipal	Clinton River	NBCR	7/17/2009				Yes	30-34		Alley		Cracked Broken	No		No
C-10	North Avenue	Commercial	Clinton River	NBCR	7/17/2009				Yes	46-48	C-9	Collector		Cracked Broken	No		No
C-12	Elizabeth Road	Commercial Municipal	Clinton River	NBCR	7/17/2009				Yes	50-53		Collector		Cracked Broken	No		No
C-13	Groesbeck	Commercial Municipal	Clinton River	NBCR	7/17/2009				Yes	54-56		Arterial		Good	No		No
C-14	Little Raod	Residential	Clinton River	NBCR	7/17/2009				Yes	57-60	C-14	Local		Cracked	No		No

**Street and Storm Drains Results  
Summer/Fall 2009**

UNIQUE_SIT	STREET_NAME	ADJ_LU	B.5 TRASH_SED	B.5 TRASH_ORG_MAT	B.5 TRASH_LITTER	C.1 CONV_TYPE	% INLET w/ STORAGE	C.3 LAT	C.3 LONG	C.3 LMK#	C.3. PIC#	C.3 CUR_CON	C.3 INLET_CON	C.3 LITTER_ACC
R-2	Van Dyke	Residential	1	1	1						E. Side of Van Dyke	Wet	Clear	No
		Commercial									W. Side of Van Dyke	Dry	Clear	No
R-5	M-53 Bypass	Residential	1	1	2	Open					W. Side of M-53	Dry	Clear	No
		Commercial									E. Side of M-53	Wet	Clear	No
R-9	Mentz	Residential	2	2	1	Closed					N. Side	Wet	Clear	Yes
											S. Side	Wet	Clear	Yes
R-13	Alley	Residential				Closed					W. Side	Wet	Clear	No
		Commercial									E. Side	Dry	Clear	No
MN-2	Palmer	Residential	5	2	1	Closed					N. Side	Wet		No
											S. Side	Wet		No
MN-4	Brighton	Residential	2	5	2	Closed					N. Side	Wet	Clear	No
											S. Side	Wet	Clear	No
MN-6	Country Club	Residential	2	2	1	Closed					S. Side	Wet	Clear	No
											S. Side	Wet	Clear	No
MN-8	26 Mile Road	Residential	5	2	2	Mixed					N. Side	Wet	Clear	No
											S. Side	Wet	Obstructed	Yes
											N. Side	Wet	Obstructed	Yes
MN-9	26 Mile Road					Open								
MN-10	25 Mile Raod	Residential				Open								
MS-2	Michaywe	Residential	1	1	1	Closed					W. Side	Wet	Clear	No
											E. Side	Wet	Clear	No
MS-3	Card Road	Residential				Open								
MS-5	Malburg Way	Residential	1	1	1	Closed					E. Side	Wet	Clear	No
											W. Side	Wet	Clear	No
MS-7	Bayhill	Residential	3	1	1	Closed					S. Side	Wet	Obstructed	No
											N. Side	Wet	Clear	No
MS-8	Grand Cypress Ct.	Residential	2	1	1	Closed					S. Side	Wet	Clear	No
MS-11	Current	Residential	1	2	1	Closed					S. Side	Wet	Clear	No
											N. Side	Wet	Clear	No
L-2	Rosy	Residential	1	1	1	Open								
B-4	Hough Road	Residential												
		Commercial												
SA-A	Alley (s. side Main)	Commercial												
A-3	Spencer Street	Residential	5	2	2	Closed					15-17	Dry	Clear	No
A-6	E. Main Street	Residential	2	1	2	Closed					N. Side	Wet	Clear	No
		Commercial									S. Side	Wet	Clear	No
A-10	North Avenue	Residential				Closed					E. Side	Wet	Clear	No
		Commercial									W. Side	Wet	Clear	No
		Industrial												
		Municipal												
A-12	Franklin	Residential				Open					E. Side	Wet	Clear	No
											W. Side	Wet	Clear	Yes
Allen-4	Capac Road	Residential				Open								
		Commercial												
Alm-2	East Ridge Drive	Residential	1	1	1	Closed					N. Side	Wet	Obstructed	No
											S. Side	Wet	Obstructed	No
Alm-5	Canterbury Lane	Residential				Closed					E. Side	Wet	Obstructed	No
Alm-8	St. Clair N.	Residential	1	3	1	Closed					N. Side	Wet	Obstructed	No
Alm-9	North Main	Commercial		3	3	Closed					W. Side	Wet	Clear	Yes
											E. Side	Wet	Clear	Yes
C-3	Hall Road	Commercial	2	2	2	Closed					S. Side	Wet	Obstructed	Yes
C-4	Macomb Industrial Drive	Industrial	3	3	3	Closed					W. Side	Wet	Clear	Yes
											E. Side	Wet	Obstructed	Yes
C-7	Rose Street	Residential	3	3	1	Closed					W. Side	Wet	Clear	Yes
		Municipal									E. Side	Wet	Clear	Yes
C-10	North Avenue	Commercial				Closed					W. Side	Wet	Clear	Yes
C-12	Elizabeth Road	Commercial	5	5	5	Closed					N. Side	Wet	Obstructed	Yes
		Municipal												
C-13	Groesbeck	Commercial				Open								
		Municipal												
C-14	Little Raod	Residential				Open								

**Street and Storm Drains Results  
Summer/Fall 2009**

UNIQUE_SIT	STREET_NAME	ADJ_LU	C.3 ORG_ACC	C.3 SED_ACC	C.3 SED_DEPTH	C.3 OIL_GREASE	C.3 SULFER	C.3 VAC_TRUCK_ACC	D.1 PARK_LOT_SIZE	D.2 UTILIZATION	D.3 PARKLOT_PAVE_CON	D.4 SW BMP?	D.4 DESCRIBE
R-2	Van Dyke	Residential	Yes	No	N/A	No	No	Yes					
		Commercial	No	No		0	No	Yes					
R-5	M-53 Bypass	Residential	No	No		No	No						
		Commercial	No	No		No	No						
R-9	Mentz	Residential	Yes	Yes		No	No	Yes					
			Yes	No		No	No	Yes					
R-13	Alley	Residential	No	No	1/2"	No	No	Yes					
		Commercial	No	Yes	2"	No	No	Yes					
MN-2	Palmer	Residential	No	Yes		No	No	Yes					
			No	Yes		No	No	Yes					
MN-4	Brighton	Residential	Yes	No		No	No	No					
			Yes	No		No	No	No					
MN-6	Country Club	Residential	Yes	No		No	No	Yes					
			No	No		No	No	Yes					
MN-8	26 Mile Road	Residential	Yes	Yes		No	No	Yes					
			Yes	Yes		No	No	Yes					
MN-9	26 Mile Road												
MN-10	25 Mile Raod	Residential											
MS-2	Michaywe	Residential	No	No		No	No	Yes					
			No	No		No	No	Yes					
MS-3	Card Road	Residential											
MS-5	Malburg Way	Residential	No	No		No	No	Yes					
			No	No		No	No	Yes					
MS-7	Bayhill	Residential	Yes	Yes		No	No	Yes					
			Yes	Yes		No	No	Yes					
MS-8	Grand Cypress Ct.	Residential	Yes	No		No	No	Yes					
MS-11	Current	Residential	Yes	No		No	No	Yes					
			No	No		No	No	Yes					
L-2	Rosy	Residential											
B-4	Hough Road	Residential											
		Commercial											
SA-A	Alley (s. side Main)	Commercial											
A-3	Spencer Street	Residential	Yes	No	6"	No	No	Yes					
A-6	E. Main Street	Residential	No	No	6"	No	No	Yes					
		Commercial	No	No	6"	No	No	Yes					
A-10	North Avenue	Residential	Yes	No		No	No	Yes					
		Commercial	No	Yes		No	No	Yes					
		Industrial											
		Municipal											
A-12	Franklin	Residential	No	No		No	No	Yes					
			Yes	No		No	No	Yes					
Allen-4	Capac Road	Residential											
		Commercial											
Alm-2	East Ridge Drive	Residential	Yes	No		No	No	Yes					
			Yes	No		No	No	Yes					
Alm-5	Canterbury Lane	Residential	Yes	No		No	No	Yes					
Alm-8	St. Clair N.	Residential	Yes	No		No	No	Yes					
Alm-9	North Main	Commercial	Yes	No		No	No	Yes					
			Yes	No		No	No	Yes					
C-3	Hall Road	Commercial	Yes	Yes		No	No	Yes					
C-4	Macomb Industrial Drive	Industrial	Yes	Yes		No	No	Yes					
			Yes	No		No	No	Yes					
C-7	Rose Street	Residential	Yes	Yes		No	No	Yes					
		Municipal	Yes	Yes		No	No	Yes					
C-10	North Avenue	Commercial	Yes	Yes		No	No	Yes					
C-12	Elizabeth Road	Commercial	Yes	Yes		No	No	Yes					
		Municipal											
C-13	Groesbeck	Commercial											
		Municipal											
C-14	Little Raod	Residential											

**Street and Storm Drains Results  
Summer/Fall 2009**

UNIQUE_SIT	STREET_NAME	ADJ_LU	D.5 Retro_Pot	E.1 POLLUTION_ACCUM	E.2 BMP FEAS	NOTES								
R-2	Van Dyke	Residential		Low	High									
		Commercial												
R-5	M-53 Bypass	Residential		Low	Low	Phragmites growing in ditches. Good candidate for bio-swale.								
		Commercial												
R-9	Mentz	Residential		Low	High	Standing water.								
R-13	Alley	Residential		Low	High									
		Commercial												
MN-2	Palmer	Residential		Medium	High	Subdivision under construction, sediment in street and around catch basins.								
MN-4	Brighton	Residential												
					High	Catch basins are labeled.								
MN-6	Country Club	Residential												
				Low	High									
MN-8	26 Mile Road	Residential		High	High									
MN-9	26 Mile Road				High	Street Sweeping								
MN-10	25 Mile Raod	Residential			High	Street Sweeping								
MS-2	Michaywe	Residential		Low	High	Storm Drains already stenciled.								
MS-3	Card Road	Residential			High	Ditches along sides of road; some trash; bioswale recommended.								
MS-5	Malburg Way	Residential		Low	High									
MS-7	Bayhill	Residential		Medium	High	New construction home sites cause of sediment in street.								
MS-8	Grand Cypress Ct.	Residential		Low	High	Flooding in spring with big storms at cul-de-sac								
MS-11	Current	Residential			High	Lot of staining in street; oil and water.								
L-2	Rosy	Residential		High		Country subdivision; 5-10 acres								
B-4	Hough Road	Residential			High									
		Commercial												
SA-A	Alley (s. side Main)	Commercial			High									
A-3	Spencer Street	Residential		Medium	Low									
A-6	E. Main Street	Residential		Low	High									
		Commercial												
A-10	North Avenue	Residential			High									
		Commercial												
		Industrial												
		Municipal												
A-12	Franklin	Residential		Low	Low	Sediment in culverts, streets crumbling, potential for bioswale, rain gardens								
Allen-4	Capac Road	Residential		Low	High									
		Commercial												
Alm-2	East Ridge Drive	Residential												
				Low	High									
Alm-5	Canterbury Lane	Residential		Low	High									
Alm-8	St. Clair N.	Residential			High									
Alm-9	North Main	Commercial												
					High									
C-3	Hall Road	Commercial			High									
C-4	Macomb Industrial Drive	Industrial		Medium	High									
C-7	Rose Street	Residential		Low	High									
		Municipal												
C-10	North Avenue	Commercial			High	Lot of trash in ditches, possible for bioswale, catch basin always floods, ditches on east side only								
C-12	Elizabeth Road	Commercial		High	High	Recommend street/catch basin cleaning.								
		Municipal												
C-13	Groesbeck	Commercial		Medium	High	Sediment & trash accumulation in ditch; bioswale, native plants.								
		Municipal												
C-14	Little Raod	Residential			High	Standing water in ditches.								

**Street and Storm Drains Results  
Summer/Fall 2009**

UNIQUE_SIT	STREET_NAME	ADJ_LU			
R-2	Van Dyke	Residential			
		Commercial			
R-5	M-53 Bypass	Residential			
		Commercial			
R-9	Mentz	Residential			
R-13	Alley	Residential			
		Commercial			
MN-2	Palmer	Residential			
MN-4	Brighton	Residential			
MN-6	Country Club	Residential			
MN-8	26 Mile Road	Residential			
MN-9	26 Mile Road				
MN-10	25 Mile Raod	Residential			
MS-2	Michaywe	Residential			
MS-3	Card Road	Residential			
MS-5	Malburg Way	Residential			
MS-7	Bayhill	Residential			
MS-8	Grand Cypress Ct.	Residential			
MS-11	Current	Residential			
L-2	Rosy	Residential			
B-4	Hough Road	Residential			
		Commercial			
SA-A	Alley (s. side Main)	Commercial			
A-3	Spencer Street	Residential			
A-6	E. Main Street	Residential			
		Commercial			
A-10	North Avenue	Residential			
		Commercial			
		Industrial			
		Municipal			
A-12	Franklin	Residential			
Allen-4	Capac Road	Residential			
		Commercial			
Alm-2	East Ridge Drive	Residential			
Alm-5	Canterbury Lane	Residential			
Alm-8	St. Clair N.	Residential			
Alm-9	North Main	Commercial			
C-3	Hall Road	Commercial			
C-4	Macomb Industrial Drive	Industrial			
C-7	Rose Street	Residential			
		Municipal			
C-10	North Avenue	Commercial			
C-12	Elizabeth Road	Commercial			
		Municipal			
C-13	Groesbeck	Commercial			
		Municipal			
C-14	Little Raod	Residential			

