

The pages in this document were taken from the "Millers Creek Watershed Improvement Plan" published in April 2004. The entire document can be found at <http://www.aamillerscreek.org/Findings.htm>.

Millers Creek Watershed Improvement Plan

**Excerpt Showing an Example of How to
Document Land Use Information**

April 2004

2.3 Significant Watershed Stakeholders and Activities

With approximately 302 acres, the University of Michigan owns 20% of the land in the watershed. Pfizer owns 175 acres, approximately 11% of the land in the watershed. The City of Ann Arbor and Ann Arbor Township jurisdictional boundaries cover approximately 862 (56.3%) and 192 acres (12.5%), respectively (refer to **Figure 2.6**). Other notable stakeholders include Altarum (formerly the Michigan Environmental Research Institute (ERIM)) and the United States Geological Survey.

2.3.1 Pfizer

Pfizer's land holdings in the watershed nearly doubled with the purchase of 54 acres of UM land along Plymouth Road in 2001. In 2002, Pfizer purchased 29 acres of the former Environmental Research Institute of Michigan (ERIM) and Veridian campuses at the corner of Plymouth Road and Green Road. This increased Pfizer land holdings to 175 acres, making it the second largest landowner in the watershed.

In addition to Pfizer's participation in community watershed programs such as initiating the development of MCAT and this plan in Fall 2001 and participating in the "Community Partners for Clean Streams" program since August 1997, Pfizer has implemented several watershed improvement projects at its facility over the last few years. These projects include upgrading the facilities storm water management system, replacing some manicured lawn areas with native prairies, restoring a wetland, and implementing a phosphorus-free fertilizing program. Future projects may include storm water improvement projects along Millers Creek on Pfizer's property, continued annual monitoring of Pfizer's onsite wetland, a study documenting water pollutant

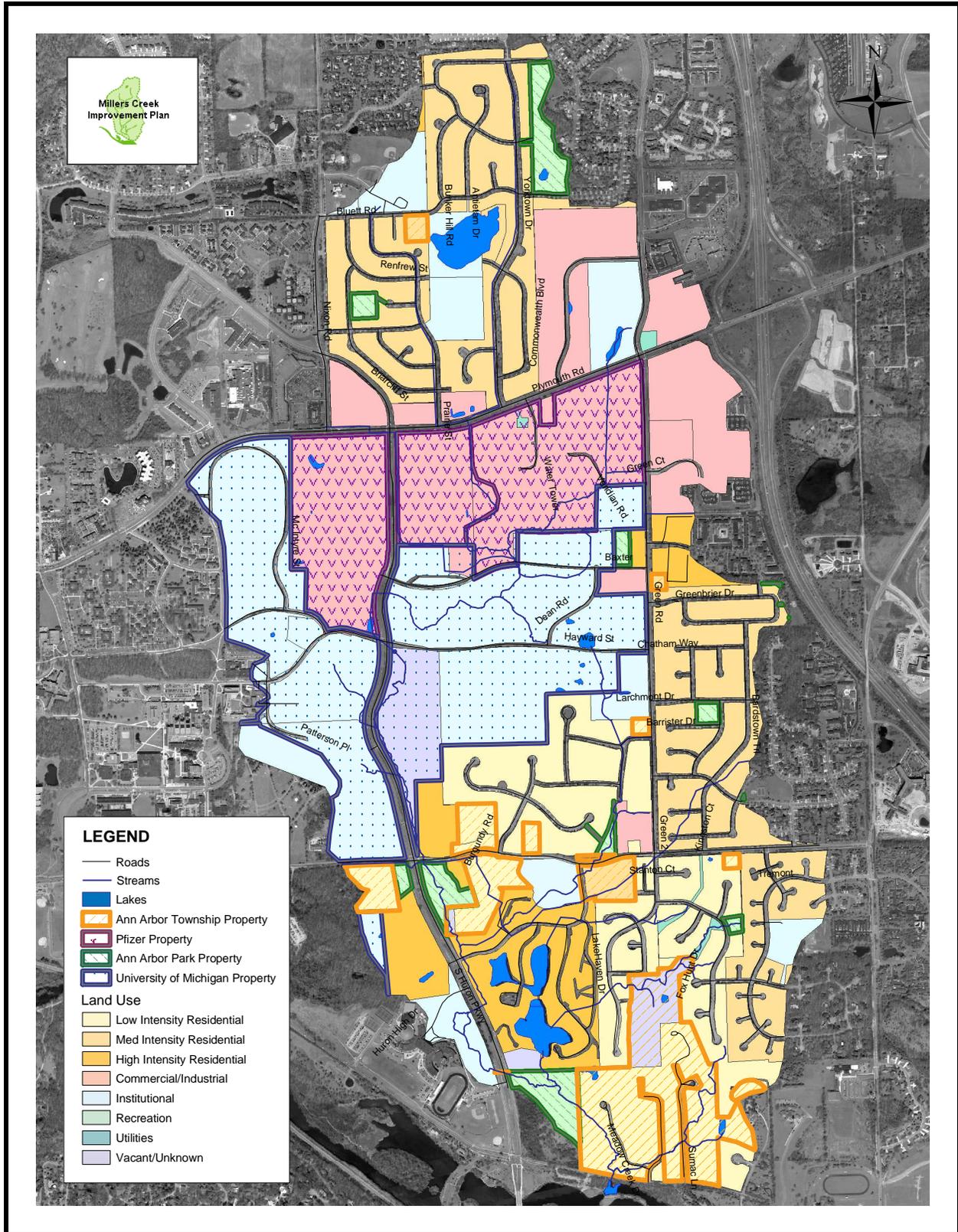


Figure 2.6 Jurisdictions and Land Holdings of Major Millers Creek Stakeholders

removal efficiency of the wetland, and installation of additional native prairies or wildflower meadows.

Pfizer also has a strong internal storm water management program. As part of Pfizer's ISO 14001 certification, Pfizer seeks continuous improvement in all environmental aspects at the site - including storm water management. The facility's Storm Water Pollution Prevention Plan is reviewed annually to identify areas for improvement in the facility's storm water management program. Any improvements identified become goals that are endorsed by site management. Pfizer environmental affairs colleagues are also involved in the early stages of all facility design projects to ensure that the proposed design will not adversely affect the storm water system at the facility. Pfizer routinely conducts general facility inspections and construction inspections to ensure complete compliance with all storm water and spill prevention regulations.

2.3.2 University of Michigan

The largest landowner in the creekshed is the University of Michigan (UM). A portion of the UM Ann Arbor North Campus is in the creekshed. As a state entity, UM regulates and manages its own separate storm water drainage system. In 1995, UM voluntarily entered into the Phase I National Pollutant Discharge Elimination System municipal storm water permit program. UM has a Storm Water Management Program, which was updated in March 2003 and includes permit requirements, public education, public involvement and participation, illicit discharge elimination, construction runoff controls, post construction storm water management, and pollution prevention & good housekeeping. Storm water education is an important focus of UM programs and takes a variety of forms, including storm water awareness announcements at football games, resources on the web (<http://www.umich.edu/~oseh/stormwater/>), video on UM cable television, and presentations geared to departments and their particular operations. UM also has a phosphorus-free fertilizer program and has created 'no mow' areas, which allow for more extensive root systems to establish and increase storm water infiltration. Other maintenance activities include a twice a year cleaning of all storm water drainage system lines and catch basins as well as routine street sweeping.

UM has several small storm water detention basins in the Millers Creek watershed at the Glazier Way commuter lot, the North Campus Grounds Service Facility, and 2901 Hubbard. Future plans include reviewing these basins for potential improvements in capacity and quality. UM recently implemented three pilot projects for innovative storm water management in parking lots, including porous pavement, a Rainsaver system, and bioretention islands. A study of flooding issues on campus has resulted in the construction of a one-million gallon storm water detention basin on Central Campus and the start of construction of a storm water detention basin and wetland on North Campus (just outside of the Millers Creek watershed). Other areas of campus are also being identified for potential future storm water management projects.

2.3.3 Altarum Institute

The Altarum Institute, formerly known as ERIM, has historically been a major landowner in the watershed. Since the 1970's when ERIM moved to its location on the corner of Plymouth and Green, several employees have worked to improve the landscape by planting trees and encouraging the Institute to practice good land stewardship. In the early 1990's, several ERIM employees began the first Millers Creek Action Team, the seeds of which are still active. Most recently, ERIM has worked on development of the land to the east of Green Road in a conscientious way to mitigate the effects of impervious surface runoff with naturalized biofiltration swales and planting of native species in the retention basins. Their new four-story building was conceived to fit with the landscape, preserving existing trees and planting native

vegetation. Currently, Altarum is in the process of creating a set of signs to point out the ways the site adheres to "Best Management Practices." It is hoped that other landowners in the watershed will use similar signage to educate and promote good land stewardship throughout the creekshed.

2.3.4 Ann Arbor Parks

City of Ann Arbor parks in the Millers Creek watershed include the Ruthven Nature Area (20.57 acres) (see **Figure 2.7**), Oakridge Nature Area (7.67 acres), Earhart and Earhart West Parks (2.23 and 0.9 acres), Glazier Hill Park (1.72 acres), Windmere Park (3.96 acres), Glacier Highlands Park (1.67 acres), Green Brier Park (3.18 acres), Folkstone Park (3.17 acres), Baxter Park (2.0 acres), Sugarbush Park (30.14 acres) and Bromley Park (2.33 acres).

2.3.5 Ann Arbor Public Schools

Ann Arbor public schools in the watershed include Huron High School (52.89 acres with approximately 5 acres in the Millers Creek watershed), Clague Middle School (23.20 acres with approximately 11 acres in the watershed), Thurston Elementary School (11.95 acres) and King Elementary School (10.08 acres). Ann Arbor public schools also own the Thurston Nature Area (16.53 acres).



Figure 2.7 Upstream of Ruthven Nature Area

Ann Arbor public Schools has a certificate of coverage for the Phase II NPDES program and is working to improve storm water management at its facilities.

2.3.6 Geddes Lake Cooperative Homes

Geddes Lake Cooperative Homes is a 360-unit residential community on 56.8 acres near the intersection of Huron Parkway and Glazier Way. A focal point of the community are three small (8.41 acres total) interconnected lakes that are remnants of a mining operation on the site during the 1950's (JJR, 1990). These lakes take the storm water runoff from the cooperative as well as approximately 152 additional acres upstream of the development. The lakes discharge through a control structure to a small open channel that outlets to Millers Creek in Ruthven Nature Area.

In 2003, the lakes' outlet structure was upgraded to meet the Washtenaw County Drain Commissioner extended detention requirements. In addition, bioengineering erosion control measures were implemented along the shorelines of the ponds to reduce sediment loading. However, a recent limnology study (Jude, 2003) indicated that water quality conditions in the lakes are relatively poor. Summer sampling found anoxic zones at the bottom of the two largest lakes and high soluble phosphorus concentrations (0.21 mg/L) suggesting that sediment phosphorus was being released into the water column. Bottom contour maps and sediment

sampling from 1990 and 2002 suggest that at least one of the lakes (the northwest lake) has experienced quantifiable sedimentation over that period.

2.3.7 Thurston Pond Nature Center

Prior to 1965, Thurston Pond was a wet prairie or marsh system with poor drainage. The superintendent of the Ann Arbor Parks and Recreation Department at the time noted that water levels fluctuated throughout the year and that sometimes the area held considerable amounts of water while at other times appeared as a mud flat (Ennett, et al., 1997).

With the development of the Orchard Hills and Bromley subdivisions, the hydrology of the marsh was so altered that it was transformed into a pond. This property, originally bought by the Ann Arbor Schools Department in 1955, was deemed unsuitable for development. In 1965, the Thurston School Parent-Teacher Organization (PTO) voted to set aside the marsh/pond as a nature study area. In 1967, the Smokler Company, developer of the Orchard Hills and Bromley neighborhoods, deeded their portion of the pond (about 1/3 the area) to the Orchard Hills Homeowners Association (OHHA). The OHHA deeded a portion of the land to the Thurston Nature Center, and the remainder eventually became the Orchard Hills Athletic Club.

In 1968, the Thurston Nature Area was officially designated a Conservation Education Reserve by the Michigan Department of Natural Resources, only the second such area in Michigan to receive this designation. Since that time, the nature area has been managed by a sub-committee of PTO volunteers.

After severe flooding in the Bromley and Orchard Hills neighborhoods in the summer of 1968, City planners decided to build a berm around the southern edge of the pond to hold excess runoff when surrounding storm sewer was at capacity. In 1972, an overflow structure was built to connect the 48-inch storm sewer main in Georgetown Boulevard to the northeast side of the pond. Another 24-inch overflow drain carries a portion of the Clague Middle School runoff into the pond on the northwest side. Two outlets on the southwest side of the pond, one inside the berm and the other outside the berm carry overflow to storm sewer on Renfrew Street that eventually empties into Millers Creek south of Plymouth Road.

In 1996, the Thurston Pond Nature Area PTO sub-committee requested assistance from the UM School of Natural Resources and Environment to enhance the pond, woodland, upland oak woodlot, tall grass prairie and old field ecosystems. Recently, after several years of lower-than-average rainfall, much of the pond was converting back into marsh. It is not clear how much of this conversion is due to natural succession, solids loading from the storm sewer or adverse, sustained weather conditions. In 2002, the PTO sub-committee decided to initiate development of a pond restoration plan. The Millers Creek Project Team began working with the sub-committee in the fall of 2002 to provide technical assistance with the restoration plan.

Watershed Conditions

Approximately 40% of the 2.4 square miles (1,531 acres) of the Millers Creek watershed is covered by lawn or “urban savanna”, an urban or suburban landscape characterized by mowed lawn and trees, and may include shrub and perennial beds (See Table 5.2 below). Approximately 13% of the area is covered by roads, and another 10% of the area is covered by rooftops. Total impervious surface area is 35% (See **Figure 5.3**). Some of this impervious surface area drains off onto pervious areas, such as grassed or forested areas. However, almost 70% of this impervious surface area drains directly to Millers Creek or to storm sewer (Directly Connected Impervious Area (DCIA) = 24%). Much of the area infrastructure was built in the 1960’s and 1970’s before storm water detention was required. Even in areas where some ponds were built, no provision was made to detain smaller storms, such as the bankfull event (channel-forming event). In addition, most of the storm sewer is designed to be self-cleaning and does not have storage, e.g., catch basin sumps, to contain runoff sediment loads (See **Figures 5.4 and 5.5** for storm sewer and problem locations).

Table 5.2 Millers Creek Land Cover by Subwatershed

<i>Subarea</i>	<i>Plymouth</i>	<i>Baxter</i>	<i>Geddes</i>	<i>Glazier</i>	<i>Hubbard</i>	<i>Huron HS</i>	<i>Lake Haven</i>	<i>Total</i>
Total Subarea Area (ac)	275.86	241.04	308.52	196.43	258.73	80.55	170.10	1531.23
Detention Basin Wetland	0.2%	0.4%	0.0%	0.3%	0.7%	0.1%	0.0%	0.3%
Emergent Wetland	0.4%	0.6%	0.1%	0.0%	0.0%	0.3%	0.2%	0.2%
Forested Wetland	1.2%	1.7%	2.7%	5.5%	1.2%	11.9%	1.1%	2.7%
Meadow/Prairie	0.8%	10.0%	0.1%	2.2%	3.6%	4.0%	0.9%	2.9%
Open Water	2.4%	0.0%	3.1%	0.0%	0.0%	0.0%	0.2%	1.1%
Parking Lot	5.2%	23.0%	0.3%	9.4%	15.4%	3.2%	2.7%	8.9%
Roads	20.4%	7.0%	13.9%	9.1%	11.5%	11.5%	16.2%	13.1%
Roof Top	11.7%	12.2%	9.0%	3.4%	11.4%	4.6%	8.3%	9.4%
Scrub/Shrub Wetland	0.0%	2.1%	3.1%	0.5%	0.1%	0.3%	0.0%	1.1%
Shrub/Immature Woodland	0.6%	6.9%	2.0%	2.9%	7.0%	0.8%	4.8%	3.7%
Lawn	48.6%	33.4%	44.0%	28.9%	40.5%	23.7%	45.4%	39.7%
Wet Meadow	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.2%	0.1%
Woodland	8.0%	2.7%	21.2%	39.0%	8.4%	39.8%	19.7%	16.8%
Other	0.3%	0.0%	0.1%	0.1%	0.0%	0.2%	0.0%	0.1%

Approximately 37% of land use in the watershed is residential (see **Table 5.3** below). The next highest land use category is institutional (UM and Ann Arbor School property) at 23% of the watershed. The next two most significant uses are commercial and industrial at 19% and recreational area at 3.5%.

The commercial and industrial uses are located along the Plymouth Road corridor in the north area of the watershed. UM owns land throughout the watershed. Most of the watershed area is within the City of Ann Arbor, although several isolated pockets of Ann Arbor Township land are located towards the southern end of the watershed.

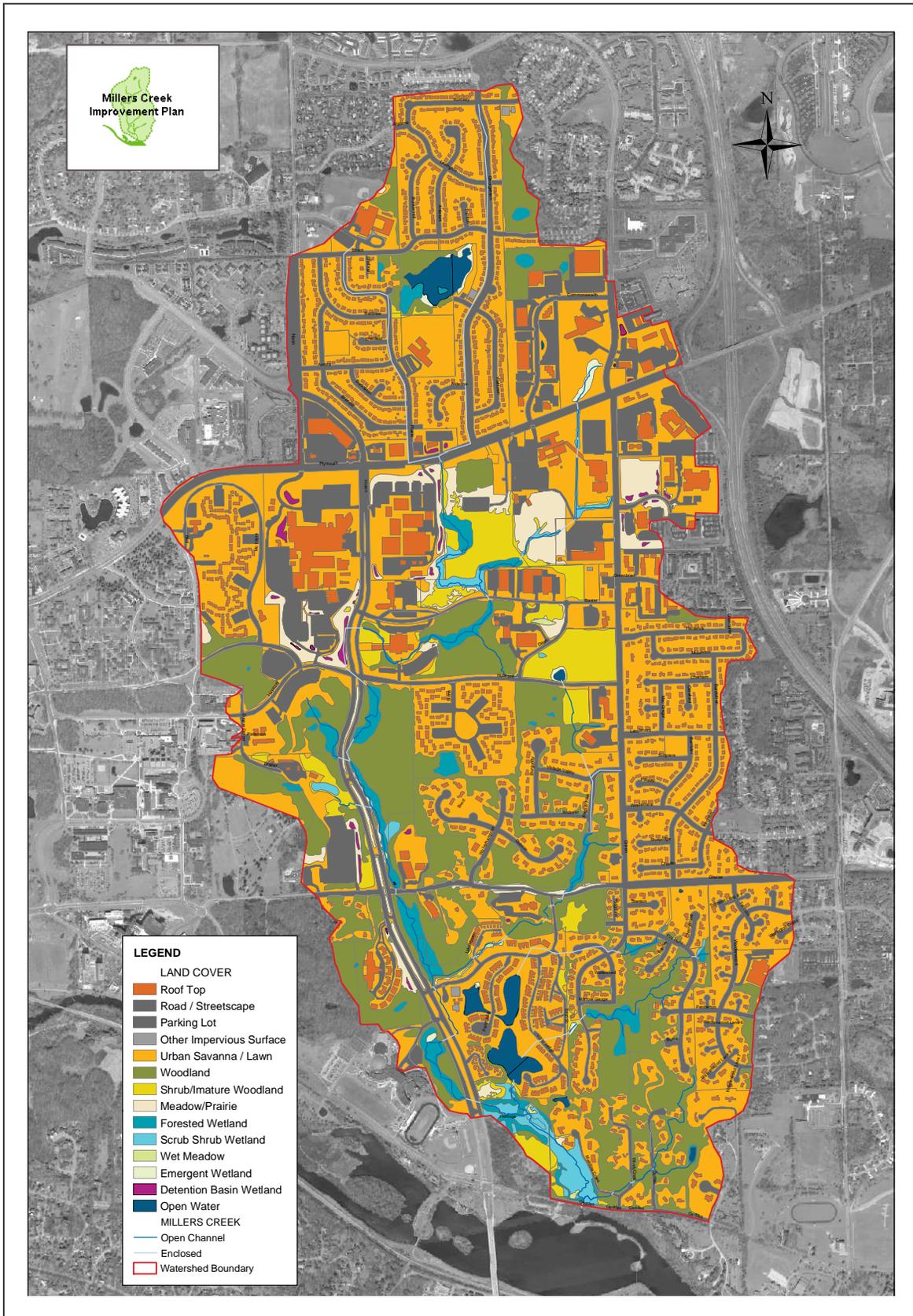


Figure 5.3 Existing Land Cover in the Millers Creek Watershed

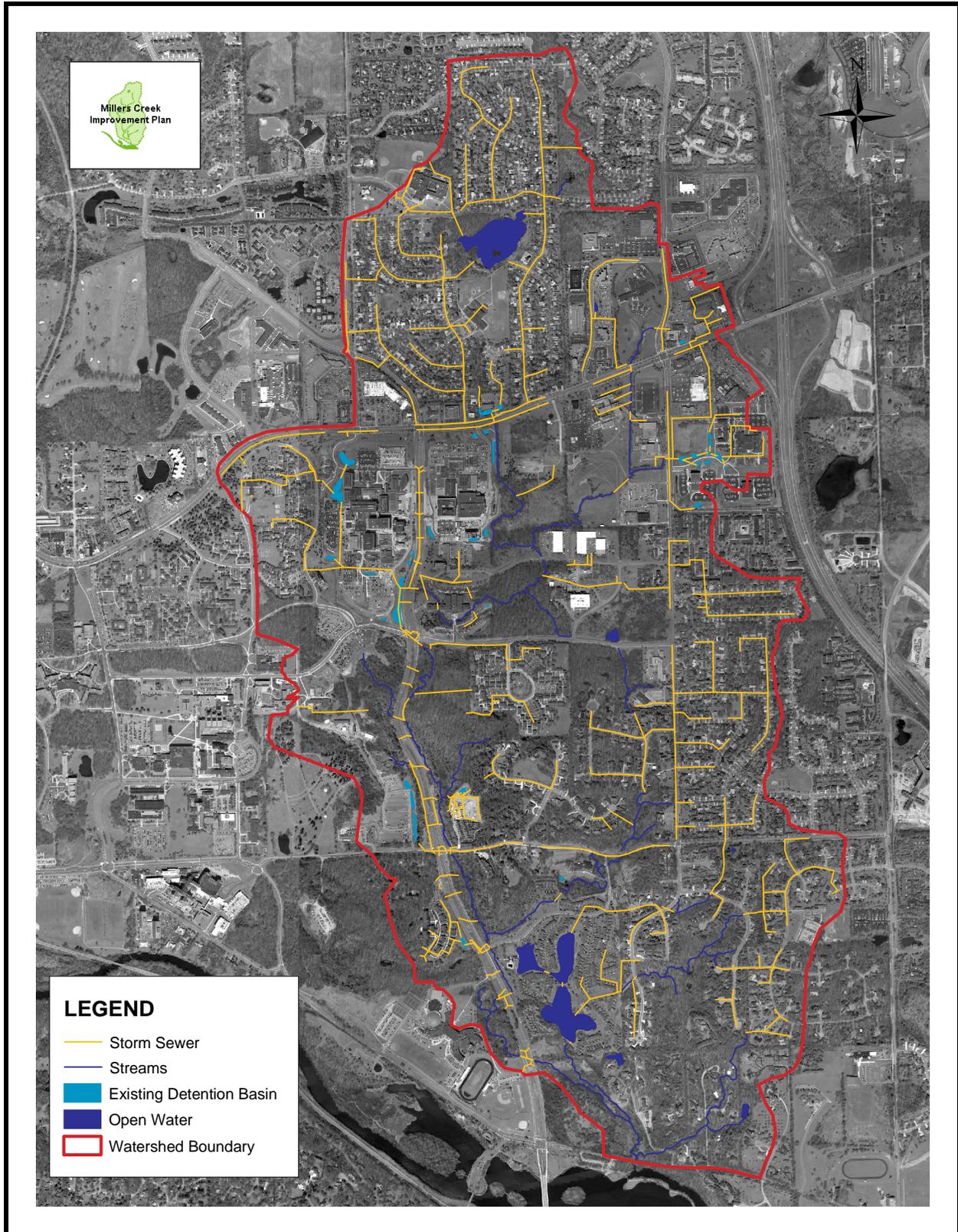


Figure 5.4 Storm Sewer in the Millers Creek Watershed

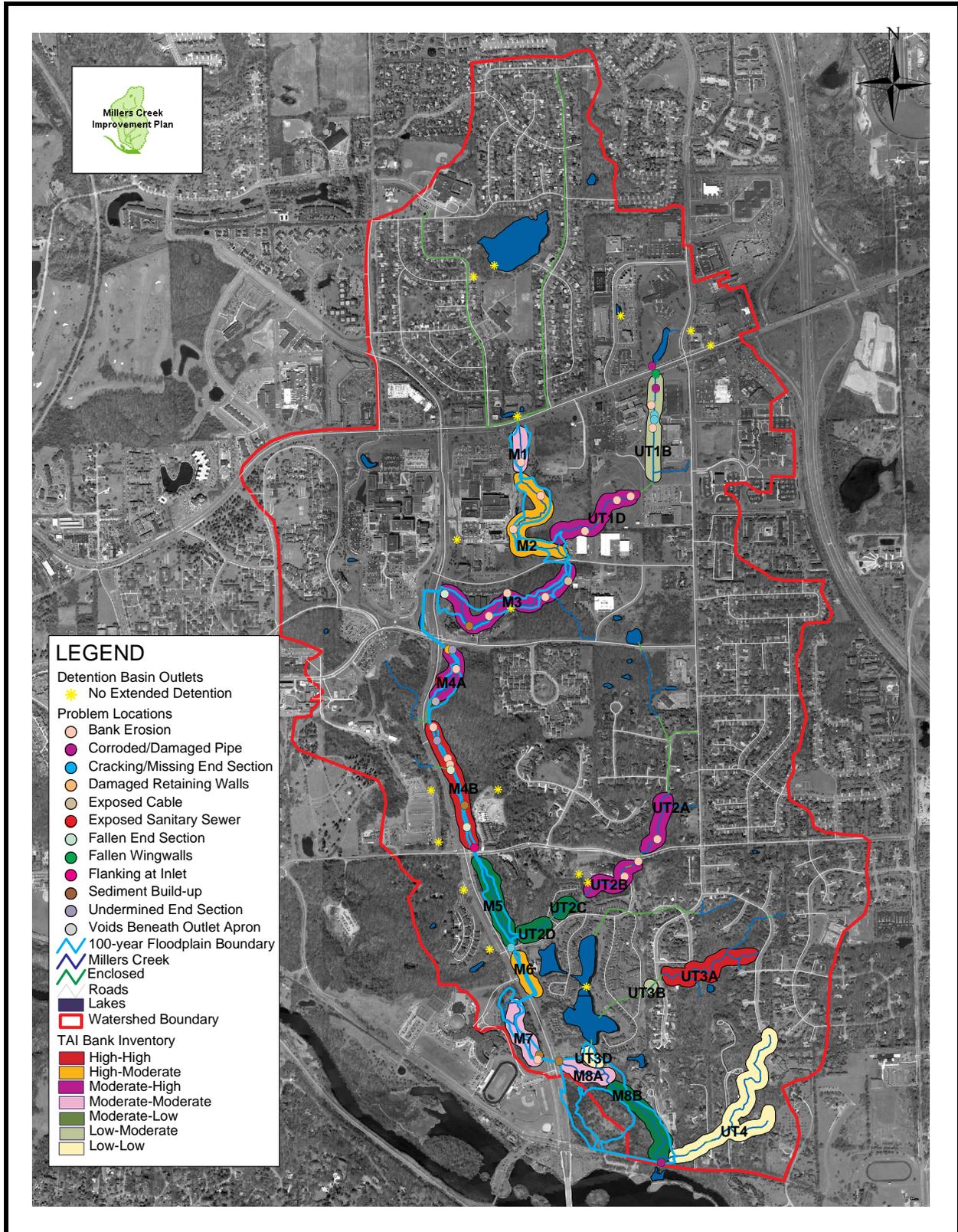


Figure 5.5 Problem Areas throughout the Millers Creek Watershed

Table 5.3 Millers Creek Land Use by Subwatershed

<i>Subarea</i>	<i>Plymouth</i>	<i>Baxter</i>	<i>Geddes</i>	<i>Glazier</i>	<i>Hubbard</i>	<i>Huron HS</i>	<i>Lake Haven</i>	<i>Total</i>
Total Subarea Area (ac)	275.86	241.04	308.52	196.43	258.73	80.55	170.10	1531.23
Commercial/ Industrial	14.1%	76.0%	0.0%	0.1%	25.7%	0.0%	3.2%	19.2%
Institutional	13.3%	16.3%	1.9%	53.5%	49.0%	20.6%	18.6%	23.6%
High Intensity Res.	0.3%	0.0%	12.0%	4.9%	5.1%	34.5%	2.6%	6.1%
Med Intensity Res.	47.2%	0.3%	16.7%	0.0%	6.7%	0.0%	29.3%	16.3%
Low Intensity Res.	0.0%	0.0%	42.6%	16.6%	0.0%	16.3%	27.0%	14.6%
Recreation	6.5%	0.0%	7.0%	0.0%	0.8%	10.7%	2.0%	3.5%
Utilities	0.2%	0.5%	0.7%	0.0%	0.0%	0.0%	0.0%	0.2%
Vacant/ Unknown	0.0%	0.0%	5.3%	13.8%	0.3%	2.3%	0.0%	3.0%
Roads	18.5%	7.1%	13.7%	11.0%	12.3%	15.7%	17.4%	13.5%