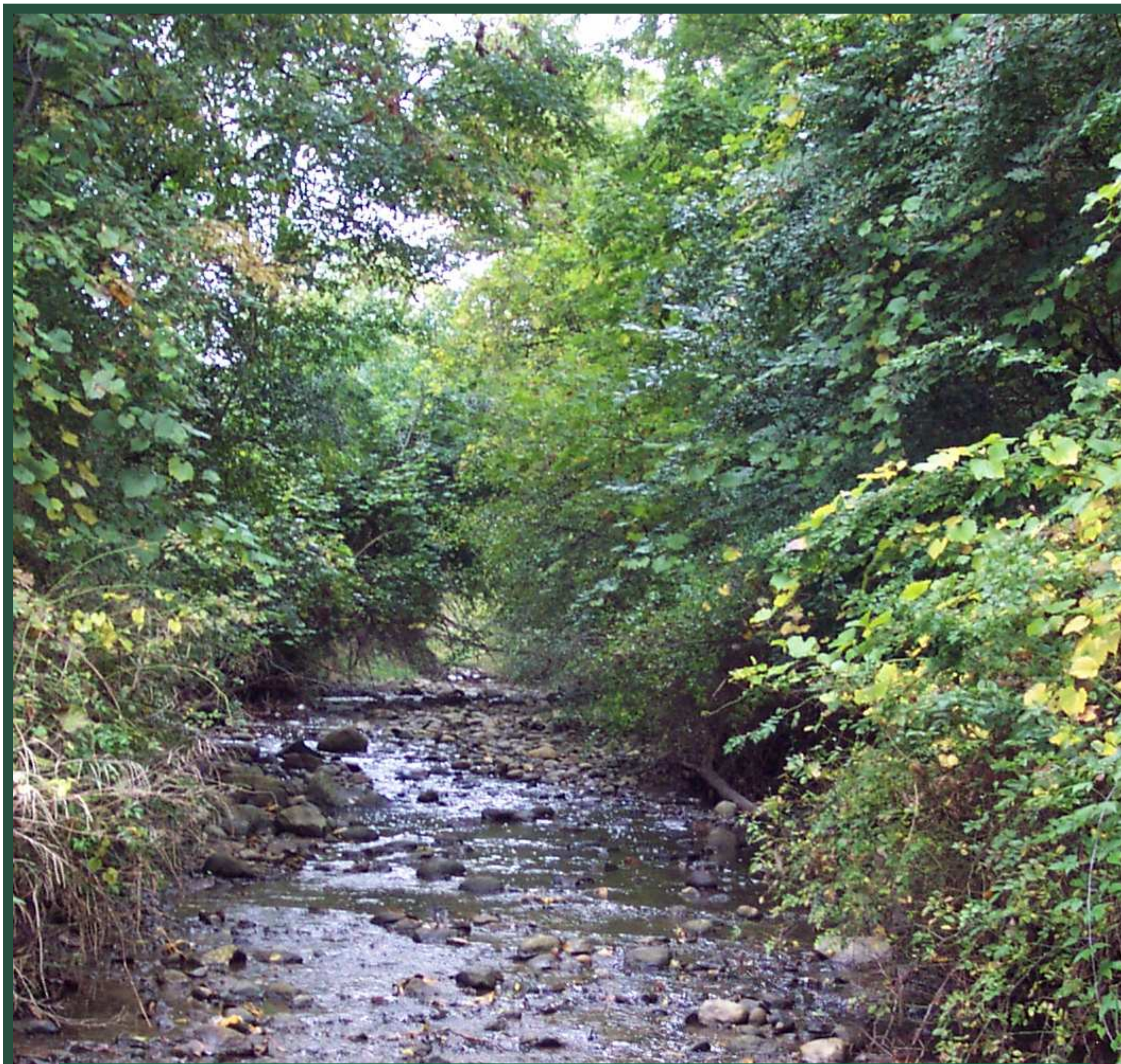

Millers Creek Watershed Improvement Plan

Prepared by:
Ayres, Lewis, Norris, & May, Inc.
Huron River Watershed Council
Tilton and Associates, Inc.

Ann Arbor, MI
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Consultant Team
Ayres, Lewis, Norris & May, Inc. (ALNM)
Huron River Watershed Council (HRWC)
Tilton and Associates, Inc. (TAI)

The Millers Creek Action Team (MCAT)
MCAT served as the oversight committee during plan development and starting in February 2004 will lead plan implementation. Organizations represented on MCAT include:

Altarum (AI)
City of Ann Arbor (AAP) Planning Commission
City of Ann Arbor (AAB) Building Department
City of Ann Arbor (AAU) Utilities Department (now Systems Planning, Public Services)
Huron River Watershed Council (HRWC)
Pfizer Global Research and Development, Inc. (PGRD)
Pollack Design Associates (PDA)
State of Michigan Department of Environmental Quality (MDEQ) – Surface Water Division
University of Michigan (UM)
Washtenaw County Drain Commissioner (WCDC)

MCAT Members
Robert Black, AI
Janis Bobrin, WCDC
Lisa Brush, HRWC
Malama Chock, UM
James D'Amour, AAP
Theresa Dakin, HRWC
Nancy French, AI
Chris Graham, formerly of AAPC
Jerry Hancock, AA
Craig Hupy, AA
Patrick Judd, PDA
Steve Kapeller. PGRD
Michael Lemon, PGRD
Joan Martin, HRWC
Stephen Rapundalo, Watershed resident (Orchard Hills neighborhood)
Laura Rubin, HRWC
Harry Sheehan, WCDC
Tom Torongo, MDEQ
Mary-Alice Wiland, AI
Mike Wiley, UM
Dennis Wojcik, WCDC

Consultants

Alicia Askwith, ALNM
Marty Boote, TAI
Heather Dermyer, ALNM
Scott Dierks, ALNM (Principal Author)
Chris Mueller, TAI
Jennifer Reiners, ALNM
Jane Tesner, TAI
Don Tilton, TAI
Michelle West, ALNM

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Thomas Edsall – Thurston Pond Group
Heidi Koester – Thurston Pond Group
Kevin Gustaffson, Eastern Michigan University Geology Department
Fred Hoitash, Huron River Valley Laboratories
Mark Banaszak Holl, UM Chemistry Dept
Dennis Kahlbaum, UM Weather Station
Paul Richards, UM
Randy Trent, Ann Arbor Schools

Huron River Watershed Volunteers

Noemi Barabas
Michael Benham
Rochelle Breitenbach
Dave Brooks
Carole Dubritsky
Bob Elliott
Barb Faust
Pam Gerecke
Ken Gottschlich
Scott Green
Cyndee Gruden
Kevin Gustavson
Gary Hochgraf
Tom Jenkins
Meroe Kaericher
Michael Kaericher
Ric Lawson
Brent Lignell
John Lillie
Sue Lillie
Mary Lirones
Richard Manczak
Thad McCollum
John Minderhout
Tui Minderhout
Beth Moore
Kirsten Mowry
Diane O'Connell
Nancy Perlman
Karen Prochnow
Cynthia Radcliffe
Chris Riggs
Don Rottiers
Bob Smith
John Stahly
Margaret Steiner
Nancy Stokes
Chad Theismann
Erin Trame
Carrie Turner
Murat Ulasir
Norma Jean Wade
Zoltan

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[2]All scenarios includes Alternatives 2, 3 & 4, Calibrations 1, 2, & 3, Buildout & Existing Conditions

1. EXECUTIVE SUMMARY

1.1 Project Background

This document is a comprehensive watershed improvement plan for Millers Creek, an urban tributary of the Huron River located on the northeast side of the City of Ann Arbor in Washtenaw County, Michigan. This project originated as a unique public and private sector partnership funded by Pfizer Global Research and Development, Inc. (Pfizer), the second largest landowner in the watershed. Plan development oversight was provided by the Millers Creek Action Team (MCAT), a voluntary group of watershed stakeholders including businesses, community representatives, and local and state entities.

This project was prompted by flooding and bank erosion on Pfizer's Ann Arbor campus (See **Figure 1.1**). Pfizer decided to investigate the problems and develop a solution by looking at their campus in the context of the entire Miller Creek watershed. With assistance from the Washtenaw County Drain Commissioner (WCDC) and the Huron River Watershed Council (HRWC), Pfizer initiated MCAT and this project. Concern for the creek coalesced in the middle to early 1990s when an earlier version of MCAT, led by the Environmental Research Institute of Michigan (ERIM), the HRWC and the WCDC began investigating possible watershed-wide improvements.

Figure 1.1 Damage on Pfizer Campus Along Millers Creek

The creek has little to no existing institutional support. It is not a county drain and is considered a receiving water for the City of Ann Arbor and the University of Michigan North Campus storm water drainage. The creek is also identified as a contributing source in the Ford and Belleville Lakes Total Maximum Daily Load (TMDL) for phosphorus and the Geddes Pond TMDL for *E. coli*.

On-going planning efforts consulted for this project include the Northeast Area Plan (NAP), the Ann Arbor Parks and Recreation Department Open Space Plan 2000-2005 (PROS Plan), and the *E. coli* implementation plan (2003). The NAP and PROS plans provided recommendations of forecasted land use for a fully built-out Millers Creek watershed.

1.2 MCAT Mission and Project Goals

The mission of MCAT is to establish and implement socially, environmentally, and economically sustainable watershed management standards and practices that will improve the quality of the Millers Creek watershed. The goals of this plan are to develop a set of recommendations that will improve stream habitat and watershed hydrology, improve recreational opportunities in and around the creek and help local stakeholders achieve the objectives of the Ford and Belleville Lakes total phosphorus TMDL and the Gallup (Geddes) Pond *E. coli* TMDL. Implementation of these recommendations will also help foster activities that perpetuate urban watershed and stream stewardship, and create a healthier balance between the local community and its ecosystems.

1.3 Project Overview

This project began in the spring of 2002. MCAT developed a work scope, selected a consultant team to prepare the Watershed Improvement Plan, and regularly advised and collaborated with the consultant team to create the plan. The consultant team compiled existing source data and undertook a detailed investigation of field conditions including watershed and subwatershed delineations, flow, velocity and, water quality measurements, in-stream and corridor habitat, macroinvertebrate diversity, stream bed and bank stability, and infrastructure conditions. Runoff, flow, velocity, and water quality models were developed and calibrated to field-collected data sets.

MCAT developed a vision statement for the watershed, including goals and objectives to measure progress. Watershed residents and other volunteers helped with stream monitoring and developing management recommendations. Feasibility and performance of each recommended improvement were assessed using qualitative and quantitative measures. This report was compiled to summarize and communicate project results. It includes a prioritized implementation plan, estimated costs and a monitoring plan.

1.4 Existing Conditions

Millers Creek is the steepest tributary to the Huron River. Over the mainstem of the creek, the average gradient (change in elevation over creek length) is 52 ft/mi. By comparison, the average gradient of the Huron River is 2.95 ft/mi. Approximately 36% of the 2.4 square mile (1,531 acres) Millers Creek watershed is covered in impervious surfaces – roads, roofs, driveways, and parking lots. Most of the storm sewer was designed to be self-cleaning and does not have catch basin sumps. Many built-out areas in the watershed have little or inadequate storm water detention storage, and watershed soils are predominantly poorly draining clay loams. This combination results in high peak flows arriving at the stream minutes after the onset of rainfall. The steepness and flashiness of the stream wreak havoc on the aquatic community by periodically wiping away the streambed and severely eroding the stream banks. In some locations near Huron Parkway, creek incision and meandering are threatening the bike path. All macroinvertebrate sampling, with the exception of the site near Narrow Gauge Way, has found an impoverished benthic community. This is probably due to frequent episodes of mobilized streambed. High concentrations of *E. coli* (up to 18,000 counts/100 ml), indicative of water contaminated with warm-blooded animal waste, have been found in several locations along the creek. High total suspended solids and high total phosphorus loads are most likely a result of runoff loads and stream bank and bed erosion. Flow and geomorphology data suggest the erosion loads are primarily originating in the middle reaches of the creek. These loads are then deposited in the creek delta that extends from Huron High School to the Huron River or are carried into the Huron River.

1.5 Improvement Plan and Analysis

An extensive list of possible improvements was compiled based on field and Geographical Information Systems (GIS) analyses. Improvement feasibility was ranked qualitatively based on technological challenges, engineering design requirements (e.g., level of complexity), property ownership, public acceptance, and potential site constraints. A total of 112 separate improvements were considered. Five alternative scenarios were created to capture key improvement recommendations and to quantify the degree of hydrologic and water quality goal attainment. The alternatives analysis was structured as a series of incremental improvements: from the least costly and most highly feasible projects to the most costly and least feasible. It was assumed that there was no practical limit on the number of improvements that could be implemented to try and reach some predevelopment standard. Research has shown that streams with a high percentage of impervious surface area (>15%) are not likely to ever be completely restored to predevelopment condition (Booth, et al. 2002). This does not invalidate the need to conserve and enhance the resource, but rather imposes realistic limits for restoration success.

1.6 Quantitative Assessment and Results

Recommended improvement performance was tested using the calibrated suite of models and literature estimates of source control effectiveness. The calibrated models were adjusted to assumed build–out conditions based on the NAP and PROS plans. The build-out scenario included 30.5 acres of new residential development, 18 acres of new commercial land with an additional 80.5 acres set aside for floodplain, recreational area or conservation easements. Since the watershed is almost completely built out, and most soils are poorly drained, hydrologic control relies almost entirely on new and retrofitted best management practices (BMPs). Results also demonstrate that even with a built-out watershed, source control is still more efficient and cost-effective for protecting water quality than end of the pipe BMPs.

1.7 Implementation, Projected Costs and Funding

Implementing the Millers Watershed Improvement Plan will require the concerted efforts of the City of Ann Arbor, Washtenaw County, Ann Arbor Township, and the University of Michigan, all of which are regulated storm water communities under Phase I and II National Pollutant Discharge Elimination System (NPDES) storm water permits. These communities are responsible for ensuring water quality and addressing water use impairments. However, a committed public-private partnership, much like the one that initiated this project, will ultimately be the key to success. All individual landowners, institutions, industries, business owners, and local units of governments have a stake in the Millers Creek improvement process and can contribute to the successful implementation of the plan.

The recommended improvements include structural and non-structural BMPs. The structural BMPs include proprietary BMPs (underground storage/treatment units), detention pond retrofits, roof drain disconnects, sediment traps, detention ponds and regional off-line peak flow reduction facilities. Some of the recommended non-structural BMPs include a phosphorus-free fertilizer ordinance, street sweeping, conservation easements, public education plans and long-term performance monitoring. Except for the purchase of (some) conservation easements, these non-structural BMPs are the most cost-effective solutions for hydrologic and water quality control. Structural BMP priorities include detention pond retrofits, roof drain disconnects, sediment traps, detention facilities and two priority streambank stabilization sites. The next priority is for regional off-line peak flow reduction facilities. Recommended streambed stabilization, daylighting and some bank stabilization measures are assigned the lowest priority.

The next major step for this plan is to obtain City of Ann Arbor, the University of Michigan and the Michigan Department of Environmental Quality (MDEQ) acceptance and endorsement. MDEQ acceptance will make the watershed eligible for Clean Michigan Initiative (CMI) and Clean Water Act-Section 319 funding, two of the most significant sources of outside support. This plan also recommends that watershed stakeholders petition for creation of a Millers Creek Drainage District to provide a long-term framework for financing improvements and maintenance activities. MCAT intends to lead implementation of this plan and offer technical and administrative assistance to watershed stakeholders.