

**REVIEW OF ORDINANCES**

**AFFECTING STORM WATER**  
**QUANTITY AND QUALITY**  
**FOR MALLETTS CREEK WATERSHED**

Prepared for:



**Washtenaw County**  
**The City of Ann Arbor**  
**and**  
**Pittsfield Township**

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## INTRODUCTION

Malletts Creek watershed, located within portions of the City of Ann Arbor, Ann Arbor Township, and Pittsfield Township, is a small tributary to the Huron River. Changes in land use within its watershed, notably increases in residential and commercial land area, have resulted in significant changes to the Creek's hydrography and water quality. As a water body that drains the storm water runoff for part of the City of Ann Arbor and Pittsfield Township, increases in impervious cover in the watershed have significantly changed the behavior of the stream. Stream flow rates can increase by five or six times within a 30-minute period during storm events. This has resulted in flooding in certain areas of the watershed and erosion along the stream banks. The increase in development and the level of residential and commercial activity in the watershed has also resulted in increased levels of sediment and phosphorus in the water body. In an effort to manage flow, sediment and phosphorus levels in Malletts Creek, the Washtenaw County Drain Commission has undertaken a planning effort to restore Malletts Creek.

In its Scope of Work for the Malletts Creek Restoration Project, Task 1 requires Environmental Consulting and Technology, Inc. (ECT) to review the ordinances that effect storm water for Washtenaw County, the City of Ann Arbor, and Pittsfield Township, and to recommend changes that would meet the objectives of the project. This document summarizes ECT's findings and provides, as attachments, specific recommendations (in the form of strikethrough edits and italics) to each of the ordinances.

## METHODOLOGY

ECT used the following methodology to complete Task 1 of the Scope of Work:

### *Ordinance Review*

ECT reviewed pertinent ordinances, policies, standards, and resolutions for Washtenaw County (Section 1), the City of Ann Arbor (Section 2), and Pittsfield Township (Section 3). ECT identified those aspects of these documents that could affect flow rates, sediment, and phosphorus levels in the Creek, such as:

- (1) levels of impervious cover allotted for parking lots, driveways, streets, and buildings;
- (2) management of storm water flows;
- (3) development and operation of storm water management systems from developed areas;

- (4) erosion and sedimentation management of construction activities; and
- (5) other elements.

### ***Literature Review***

ECT then reviewed the literature to identify changes that could be made to the reviewed documents (based upon the experiences of other localities in the United States) to better manage storm water quantity and quality. Appendix A presents the list of references reviewed by ECT.

### ***Recommendations***

ECT then reviewed and edited selected documents to reflect recommended changes.

## ***Findings***

ECT found that various aspects of the Washtenaw County Drain Commission, City of Ann Arbor, and Pittsfield Township ordinances already manage storm water flows quite effectively. Particularly, the Drain Commission did an excellent job in developing its “1997 Draft Rules of the Washtenaw County Drain Commissioner — Procedures and Design Criteria for Storm Water Management Systems”. The design drawings are very good and both the City of Ann Arbor and Pittsfield Township should consider adopting part or all of these draft rules.

In fact, the effective management of storm water flows in Malletts Creek may require the development of a single storm water ordinance — identical in both Ann Arbor and Pittsfield Township — that mirrors the Drain Commission’s own ordinance. ECT found significant differences in language (and perhaps intent) in each of the three governments’ ordinances. The Drain Commission may wish to evaluate the possibility of continuing its leadership role by working with appropriate jurisdictions to create uniform storm water management regulations and to encourage the creation of uniform regulations covering all aspects of development. A single document then could be distributed from the County, municipality, or township offices to guide developers. This would provide concise and consistent regulations that do not conflict with one another and that clearly establish the expectations of developers and contractors, and reduce the time and expense of plan preparation and agency reviews (since the agencies would all be reviewing identical sets of plans).

Specifically, the issue areas that would benefit from more consistent ordinances include, but are not limited to:

- (1) protection of natural features;
- (2) watercourses;
- (3) wetlands;
- (4) storm water management;
- (5) soil and sediment control; and
- (6) streets, roads, driveways, parking lots, sidewalks and bike paths.

Washtenaw County may wish to retain professional assistance should the County, the municipalities, and the townships choose to pursue the development of consistent ordinances, standards, and policies. Zoning professionals have the expertise to draft ordinances, standards, and policies that will remain consistent and enforceable over time while providing flexibility to accommodate changing needs and conditions.

# GENERAL ORDINANCE RECOMMENDATIONS

While Sections 1, 2, and 3 provide ECT's specific recommendations for each of the ordinances, this section consolidates these recommendations into a general summary.

## *Imperviousness*

As increases in impervious cover increase the amount of storm water entering Malletts Creek and the rate of that entry, ECT recommends changes to the ordinances that will reduce the amount of impervious cover created by development. Recommendations with regard to impervious cover include:

- Definition. Define impervious cover in the ordinances and acknowledging its detrimental impact on the watershed;
- Parking Spaces. Limit the number of parking spaces associated with commercial and industrial development, rather than establishing a minimum. Reduce the allowable size of a parking space to a width of nine feet and a total length (including any overhang) of 18 feet, with the exception of handicapped parking spaces. Consider dedicating areas for large or oversized vehicles and compact vehicles.
- Parking Lots. Increase the amount of required landscape area on parking lots.
- Street Widths. Reduce allowable street widths to, in essence, a nine-foot wide travel lane with enough space for safe travel. Rural two-lane roads could be reduced to a width of 22 feet, and urban two-lane roads should be reduced to a width of 28 feet (with parking on one side only).
- Cul-de-Sacs. Limit the allowable traffic lane radius of a cul-de-sac to 35 feet without parking and 44 feet with parking.
- Sidewalks and bike paths. Limit the allowable width of a sidewalk to four feet and a bike lane to four to six feet, rather than establishing that width as a minimum.

The above recommendations are intended to maximize infiltration and minimize runoff and are not intended to be one size fits all for all circumstances.

We anticipate that the County would meet resistance from community members in making these changes, especially due to the popularity of larger personal automobiles and trucks (e.g., sport utility vehicles). Community members should be made aware that the cost of larger vehicles extends beyond purchase and gasoline prices. The impervious surface required to accommodate these vehicles results in increased construction and maintenance costs of roads, streets, and storm water management systems, and in poorer water quality, water resources, wildlife habitat, and recreational opportunities.

## ***Flow Management***

Where pervious cover exists and allows for water storage and infiltration into the soil, ordinances should encourage the flow of storm water into these areas.

Recommendations with regard to flow management include:

- Sidewalks. Sidewalks should be sloped away from the street, not toward the street. This will cause storm water flow to drain onto pervious, rather than impervious, surfaces.
- Parking Lot Islands. Require that parking lot islands be landscaped (to provide for interception, evapotranspiration, and infiltration of precipitation). Also require that parking lot islands be placed one to two inches below the level of the parking lot to drain a 10-foot perimeter surrounding the island.
- Berms and Curb-and-Gutter. Strongly discourage or prohibit the use of berms and curb-and-gutter on parking lots. Instead, encourage the use of bumper guards and grassed swales or filter strips to separate parking spaces/rows.
- Lawn Extensions. Any lawn extensions should be grassed, not paved, and should be located one to two inches below the level of the top of the curb. This will keep runoff from smaller storm events on the lawn extension (allowing infiltration) and out of the storm drain.

Changes to the ordinances that direct flow to pervious surfaces may provide for ground water recharge, possibly augmenting the base flow of Malletts Creek and improving its suitability for aquatic habitat.

## ***Storm Water Management***

The different ordinances acknowledge and discuss the importance of storm water management to varying degrees. Also, the ordinances differ in the degree to which they require storm water designs that minimize flooding, sediment control and phosphorus levels. Recommendations with regard to storm water management include:

- Definition. Define storm water management and storm water management systems in the ordinances. Afford these areas the same level of protection from encroachment as afforded other “natural areas” to safeguard their performance.
- Required Information. Upon submission of the design of a storm water management system, require project proponents to include calculations of runoff volume, impervious cover, detention pond size, release rates, etc.
- Flood plains. Discourage or prohibit the location of storm water detention ponds within the 100-year floodplain (with the exception of publicly-owned, regional storm water management systems). The drainage areas associated with on line storm water management systems within a floodplain are too large for site-specific

storm water management systems to work. Any storm water detention pond located within a 100-year floodplain should be designed by a professional engineer and must be accompanied by a hydrologic study

- Detention pond size. Require detention ponds to catch the first flush, bankfull flow, and 100-year storm event. Extended duration (dry) ponds should be sized to draw down the water level in between 24 to 72 hours.
- Detention pond design. Require all detention ponds to have sediment forebays. Encourage the use of deep extended duration wet ponds or extended duration dry ponds.
- Easements. In addition to requiring easements for access to storm sewers and designated County drains, require easements for access to any component of a storm water management system, including detention ponds, swales, catch basins, etc.
- Wetlands. Prohibit the use of natural wetlands as components of a storm water management system.
- Treatment requirements. Require treatment in any storm water management system. For example, require the use of oil and grit separators with installed catch basins.
- Conditions of permit issuance. Require that any storm water management system be operational before allowing occupancy of a completed development.

### ***Construction Activities***

The release of soil and sediment from construction sites may be one of the larger inputs of phosphorus to Malletts Creek and the Huron River. High levels of sediments also increase the turbidity of water, inhibiting plant growth and thereby limiting nutrient uptake by aquatic vegetation. Given the high levels of observed sediment in Malletts Creek and existing detention basins, controlling sediment and erosion at construction sites should be a high priority for the County.

- Goal. Establish the goal that sediment and erosion control activities on construction sites should eliminate accelerated sedimentation and erosion, not just reduce it.
- Required information. Require that project proponents provide information on soil erodability and infiltration capacity by using Natural Resource Conservation Service or other data of comparable quality.
- Soil stabilization. Require the stabilization of soil within seven days of land clearing, and also require stabilization following each stage of construction activity, not just at the commencement of construction activity.
- Soil and debris removal. Require the daily, not just timely, removal of soil and debris from the construction site, particularly during periods of likely storm events.
- Conditions of permit issuance. Require that the soil and sediment control system be operational prior to issuing a mass grading or building permit. Additionally, if the control system will also serve as the permanent storm water management system for

the development, require the removal of any sediment from the system following the completion of construction activity.

- Silt fence reinforcement. Require contractors to reinforce the low point of silt fences to prevent failure. The removal of sediment from silt fences should also be a component of the daily debris removal.
- Numeric runoff targets. While neither the U.S. Environmental Protection Agency nor the State of Michigan currently establishes numeric limits for sediment or nutrient concentrations in runoff or ambient waters, the County should establish monitoring requirements at outlet points of soil and sediment control systems. ECT recommends 150 parts per million of suspended sediment, an amount equal to approximately six times reported “natural” ambient conditions. The absence of numeric targets complicates effective management of control systems and also enforcement of ordinances.

### ***Irrigation Systems***

Project proponents frequently use automatic irrigation systems to maintain the vegetation on landscaped areas. ECT recommends that the ordinances require the use of rain sensors to shut these systems off during rain events (thereby decreasing the level of soil saturation and total storm water runoff). Additionally, ECT recommends the use of detention pond water for irrigation wherever possible. This will increase the storage capacity of wet detention ponds and will increase infiltration rates, augmenting the base flow of the creek.

### ***Other Recommendations***

ECT has also provided a number of miscellaneous recommendations to the ordinances. These include:

- County road ordinance. The County road ordinance should require storm water management systems for run off from all new roads and major reconstruction of existing roads. These systems should be designed and built in accordance with the County’s Drain Commissioner’s Rules for Storm Water Management, and as a minimum, the soil and sediment control plan should be approved by the County Soil and Sediment Enforcing Agent.
- Penalties. Ordinances should include penalties on a daily, not one-time, basis for violations.
- Native vegetation. Ordinances should require the use of native vegetation for landscaping and storm water management systems. This will increase the quality of habitat for native aquatic and terrestrial wildlife and improve biological diversity in the region.

## Specific Recommendations

Sections 1, 2, and 3 provide ECT's specific recommended changes to the ordinances. The attachments provide new language in *italics* and indicate deleted language in ~~strikethrough~~.

**SECTION 1**

**WASHTENAW COUNTY**

**Washtenaw County Road Commission  
Procedures & Guidelines for Developing Public Roads**

**Washtenaw County  
Soil Erosion & Sedimentation Control Ordinance, 1997**

**Rules of the Washtenaw County Drain Commissioner**

**WASHTENAW COUNTY ROAD COMMISSION  
PROCEDURES AND GUIDELINES FOR DEVELOPING PUBLIC ROADS**

**General Recommendations**

*All road side grades from the curb should slope away from the road towards the front setback, including sidewalks. All new County roads and major reconstruction of existing roads should incorporate a storm water management system designed after the Washtenaw County Drain Commissioner Rules. Soil and sediment control plans should be approved by the County enforcing agent.*

**Specific Recommendations**

**SECTION IV – PROCEDURES AND GENERAL REQUIREMENTS**

B. 5. c. In cases where a proposed road provides access to an existing public road at one end only, its layout may be acceptable provided that a circular cul-de-sac of 75-foot minimum right-of-way radius is provided at the end of the road so as to permit turning in a continuous circuit. Pavement radius must be at least ~~50~~ 35 feet in rural areas and ~~55~~ 40 feet to back of curb in urban areas. Some other means of continuous circuit may be approved by the Board if presented in detail with sufficient documented justification.

C. 1.  
paragraph 7

All roads shall be provided with facilities for adequate surface drainage *and detention*. In rural areas, this may be accomplished by ~~the use of~~ discharge from storm water management systems to ditches, county drains, natural water courses, or constructed tributaries thereto. ...

2. q. Soil boring logs at sufficient intervals to determine the subgrade condition *and erodability of exposed soil*.

add v.

v. *A storm water management plan in accordance with the Washtenaw County Drain Commissioner Rules.*

3. a. 1) a) Show location and type of inlets and cleanout points for underground drainage systems, including ~~sumps~~ pretreatment devices in all catch basins.

**SECTION V – ROAD DESIGN AND CONSTRUCTION STANDARDS**

- A. 1. a. 1) Less than one half-acre lots
  - Curb and gutter – ~~34'~~ 32' back to back, M.D.O.T. type F4 or D2 (modified)
  - Bituminous Base – 2" M.D.O.T. Bituminous Mixture Type 11A, width ~~30'~~ 28'
  - Surface – 3" M.D.O.T. Bituminous Mixture type 13A, width ~~30'~~ 28"
- A. 1. a. 2) One half-acre lots or larger, with 100' frontage
  - Bituminous Base – 2" M.D.O.T. Bituminous Mixture Type 11A, width 24' 22'
  - Surface – 3" M.D.O.T. Bituminous Mixture Type 13A, width 24' 22'
- A. 1. 2) c. Rural Local and Residential Roads
  - Bituminous Base – 2" M.D.O.T. Bituminous Mixture Type 11A, width 24' 22'
  - Surface – 3" M.D.O.T. Bituminous Mixture Type 13A, width 24' 22'
- A. 1. 2) d. Rural Collector and Industrial Roads
  - Bituminous Base – 3" M.D.O.T. Bituminous Mixture Type 2B, width 24' 22'
  - Surface – 3" M.D.O.T. Bituminous Mixture Type 3B leveling and 4B wearing, width 24' 22'; Paved shoulder may be required
- A. 2. a. Urban Local and Residential Roads
  - Surface – 7" M.D.O.T. P1 concrete, width 34' 28' back to back
- A. 2. b. Rural Local and Residential Roads
  - Surface – 7" M.D.O.T. P1 concrete, width 24' 22'

**TYPICAL CROSS SECTIONS**

FUNCTIONAL CLASS	ROADBED		
	PAVEMENT	SHOULDER	CURB
BITUMINOUS			
RURAL, LOCAL & RESIDENTIAL	24' 22'	4'	NA
RURAL COLLECTOR & INDUSTRIAL	24' 22'	4 to 8'	NA
URBAN LOCAL & RESIDENTIAL	<del>30'</del> 22'	NA	Y
URBAN COLLECTOR & INDUSTRIAL	36'	NA	Y
CONCRETE			
RURAL LOCAL & RESIDENTIAL	24' 22'	4'	NA
URBAN LOCAL & RESIDENTIAL	34' 28'	NA	Y
COLLECTOR	40'	NA	Y
INDUSTRIAL	40'	NA	Y

B. Horizontal Alignment of Roads

9. Cu-de-sac roads shall terminate in circular pavement areas that are a minimum ~~50~~ 35 foot radius, as shown in the illustrations. If an island is provided, ...

## SECTION VI – DRAINAGE DESIGN AND CONSTRUCTION STANDARDS

All roadway surfaces and other areas within the road right-of-way shall be designed, constructed and maintained such that surface water is free to drain to ~~existing drainage courses~~ *the storm water management system*. Discharged water flowing onto adjoining property should follow an established drainage course. The drainage flowing into County ditches in existing road right-of-way from adjoining property shall not be allowed to increase as a result of any new development.

### A. Approval Authority paragraph 2

For drainage improvements on county drains and drainage systems which will be dedicated to the Drain Commissioner, the proprietor will be required to obtain the Drain Commissioner's approval prior to the Road and Drainage Plan approval. For drainage improvements on watercourses under the jurisdiction of the Michigan Department of Environmental Quality (MDEQ) and for improvements impacting regulated wetlands the proprietor will be required to obtain a MDEQ permit *and local government approval if the wetlands or watercourse are regulated by a local government* prior to the Road and Drainage Plan approval.

### B. Drainage Easements

Drainage from the road right-of-way may be accommodated by drains located in an adjoining drainage easement. As deemed necessary by the Road Commission, all such drains carrying significant proportions of the run-off from the road right-of-way shall be enclosed drains with approved material, size and grade in accordance with the *storm water management* design standards of the Washtenaw County Drain Commission. All other appurtenances such as headwalls and manholes shall be in accordance with the current M.D.O.T. Standards.

### C. Drainage Design

The *storm water management* drainage design shall be in accordance with the ~~agency~~ *Washtenaw County Drain Commission Rules for storm water management that has jurisdiction over the watercourse*. In no case shall the design flow capacity be less than a 10 year, 24 hour storm event. ...

### D. Storm Sewers

3. c. All catch-basins shall have ~~sumps~~ *pretreatment devices*.

### E. Roadside Ditches

3.

Ditches along existing county roads adjacent to the development shall be cleaned out to such a depth, and, to such an extent as to provide drainage *in accordance with 1 above*. All brush, fences, obstructions, etc., shall be removed from the right-of-way. Trees shall be removed as directed by the Washtenaw County Road Commission.

**WASHTENAW COUNTY  
SOIL EROSION & SEDIMENTATION CONTROL ORDINANCE, 1997**

**ARTICLE V**

**A. Grading Plans**

**Major Projects**

- Site plan at scale of no more than 1 inch = 100 feet which includes:
  - Location of predominant features, including all proposed and existing structures and vegetation on-site and extending 50 feet beyond property lines
  - Location and written description of soil types, *soil borings describing depth to seasonal high water, erodability, soil profile consistent with USDA NRCS soils descriptions and any other information that would affect the success of the erosion control measures.*

**ARTICLE VI**

**Inspections**

paragraph 2

If upon inspection, existing site conditions are found to be in conflict with an approved Grading Permit or plan, a stop work order may be issued. No earth moving shall be done until all violations have been addressed, and/or until revised plans have been submitted, reviewed, approved, and the Grading Permit or plan modified *except for those activities ordered by an SESC officer to prevent the continued erosion and loss of soil and sediment from the site.*

**ARTICLE VIII**

**C. Notice of Noncompliance**

If the County SESC program determines that a violation of this Ordinance and Part 91 is occurring, it may seek to enforce compliance by notifying the person who owns the land by way of a stop work order. If no response has been received from the party in violation within ~~a time determined~~ *5 days* by this office, a letter will be sent by certified mail, with return receipt requested, outlining the violations. The notifications shall contain a description of specific control measures that would bring the landowner into compliance. The control measures listed in the notification shall be implemented within ~~10~~ *7* calendar days from the date ~~d~~ mailed.

**ARTICLE IX**

**Remedies and Penalties**

Any violations of Part 91, Administrative rules, or this ordinance are considered criminal misdemeanors and/or civil infractions that may be remedied by the following criminal and/or civil penalties:

- Upon conviction, ninety (90) days in jail and/or a one hundred (\$100.00) dollar fine.
- A five hundred (\$500.00) dollar civil fine if *for each day* the person fails, after proper notice, to comply with Part 91 and this Ordinance.
- Upon ~~ten (10)~~ *seven (7)* days written notice to the property owner, if the violations have not been corrected, the SESC Program may enter upon the land and construct, implement and maintain soil erosion and sedimentation control measures which comply with this Ordinance and the Act, ~~provided, however, that such remedial measures may not exceed five hundred (\$500.00) dollars.~~ Upon ~~twenty (20)~~ *seven (7)* days after written notice to the property owner, however, if the violations have not been corrected, the SESC Program may enter upon the land and construct, implement, and maintain soil erosion and sedimentation control measures in any amount necessary to correct the violation. ...

# RULES OF THE WASHTENAW COUNTY DRAIN COMMISSIONER

## Specific Recommendations

### Procedures and Design Criteria for Stormwater Management Systems

#### I. INTRODUCTION

#### FRAMEWORK FOR THE DESIGN OF STORMWATER MANAGEMENT SYSTEMS

##### Site Source Controls

##### Preferred Hierarchy of Structural Site Controls

- 2) The next most effective stormwater site controls reduce the runoff peak, and involve storage facilities such as retention and detention ponds. In the selection of an appropriate stormwater pond design, *extended* wet ponds are generally preferable to ~~detention~~-dry ponds, since they hold stormwater much longer, allowing more particulates to settle out. ...
- 3) Where site conditions make the use of an *extended* wet pond infeasible, *dry* ponds should be designed to provide extended detention of stormwater, again to promote as much settling of particulates as possible. A notable exception to this preference exists within areas where thermal impacts are a concern. Since they hold stormwater longer, wet ~~and~~ extended detention ponds tend to increase the exposure of runoff to solar warming before releasing it. Where thermal impacts are of primary concern, shorter ~~retention~~-detention time may be ponds are preferable ~~when stormwater management cannot be managed through source controls~~. *Bottom draw from deep (over 5 feet) detention ponds may be required to provide the coolest possible water.*

#### II. DEFINITIONS

add

##### ***Bottom Draw***

*To take water from the bottom of a pond. Normally used to discharge the coolest water from a pond.*

##### **Detention Basin**

3. Wet ~~Retention~~ Detention Basin

add

4. Extended Wet Detention Basin

*A wet detention basin that has been modified to increase the length of time that stormwater will be detained to between 24 and 72 hours.*

**Invert**

~~The interior surface of the bottom of any pipe.~~ *The elevation of the bottom interior surface of a conduit at any given cross section.*

**PART I**  
**PROCEDURES FOR SUBMISSION AND REVIEW OF PLATS AND CONSTRUCTION PLANS**

**II. PRELIMINARY PLAT SUBMISSION AND APPROVAL**

3. The preliminary ~~plat~~ plan will include:
- a. The location of the proposed ~~subdivision~~ *development* by means of a small location map
  - g. The number of acres to be platted *or developed*
  - j. Any water course passing through *or within 500 feet of the* ~~subdivision~~ *development*, along with the following:  
add  
*l. Any other information required by other federal, state or local units of government.*  
add  
*m. Soils description in accordance with the U.S. Dept. of Agriculture Natural Resource and Conservation Service, standard soils criteria including clay content and erodability.*

**III. CONSTRUCTION PLAN APPROVAL**

*add paragraph at end of A.*

*Construction Plans must be submitted for all plats, site condominiums, planned unit developments, developments referred by townships or municipalities and any project that could have an adverse impact on water quantity or quality of a county drain or physically alter a county drain.*

- A. 1. h. Topographic maps, at two foot contour intervals or less on U.S.G.S. datum, showing existing and proposed grades of the entire area to be ~~subdivided, developed~~ as well as off-site topography over at least 100' of the adjoining property. Maps will also show all existing water courses, lakes and wetlands, and the extent of all off-site drainage areas contributing flow to the development *and within 500 feet of the development.*
- A. 1. i. The number of acres proposed to be ~~platted~~ *developed* and, for phased developments, the number of acres in each phase.

**PART II**  
**DESIGN CRITERIA FOR STORMWATER MANAGEMENT SYSTEMS**

**II. DESIGN STANDARDS FOR CONSTRUCTED STORMWATER MANAGEMENT FACILITIES**

**A. RETENTION AND DETENTION SYSTEMS**

paragraph 5

Controlling both extremely large events, to prevent flooding, and more frequent events, to mitigate water quality impacts and channel erosion, can be achieved through the proper design of detention/retention basins. Among alternatives, *extended* wet ponds and constructed marsh systems are the most effective for achieving control of both stormwater volume and quality. Extended detention ponds providing two-stage pond designs (containing an upper, dry stage and a lower stage, with a permanent pool) are also ~~acceptable~~ *encouraged*.

**1. GENERAL REQUIREMENTS**

b. When discharge is within a watershed where thermal impacts are a primary concern, *deep wet ponds with bottom draw or dry ponds* will be preferred to wet ponds, and extended detention (first flush and bankfull) requirements may be reduced to 12 hours (see Appendix C, Paint Creek and Johnson Creek Watersheds). Shade plantings on the west and south sides of facilities are encouraged.

c. Public safety will be a paramount consideration in stormwater system and pond design (see Part II, Section X). Providing safe ~~retention~~ *detention* is the proprietor's responsibility. ...

e. Storage Volumes and Release Rates

ii. ... The release rate from the "bankfull" storage volume will be such that this volume will be stored not less than 24 nor more than ~~40~~ 72 hours.

f. i. The forebay will be a separate cell, which ~~can~~ *may* be formed by gabions or an earthen berm *or other suitable structure*.

f. iii. Direct *physical* maintenance access to the forebay for heavy equipment will be provided *as well as necessary easements*.

g. Basin Inlet/Outlet Design

viii. All outlets will be designed to be easily accessible for heavy equipment required by maintenance purposes *and necessary easements will be required*.

h. Vegetative Plantings Associated with Retention/Detention Facilities

ii. A permanent buffer strip of natural vegetation (*preferably native to Michigan*) at least 25 feet in width will be maintained or restored around the perimeter of all ponds and marshes. No lawn care chemical applications shall be applied to the buffer zone.

**3. WET DETENTION BASINS**

c. A marsh fringe should be established near the inlet ~~of~~ and forebay and around at least 50% of the pond's perimeter.

e. To ~~avoid~~ minimize drawdowns, a reliable supply of baseflow and/or groundwater ~~will~~ may be required.

f. If underlying soils are highly permeable (e.g., in the "A" or "B" hydrologic groupings), *at least 50% in the deepest area*, the bottom of the basin should be lined with an impermeable geotextile or a 6 inch clay liner. (For NRCS Soil Hydrologic Groupings, see Appendix K)

**4. EXTENDED DRY DETENTION BASINS**

a. i. paragraph 2

At a minimum, the volume of runoff detained in the entire lower stage should be equivalent to the runoff volume produced by a 1.5-year storm *and detention time should be not less than 24 hours or more than 72 hours*.

**5. STORMWATER WETLAND SYSTEMS**

Background

paragraph 2

As a general rule stormwater wetlands ~~should~~ may not be located within delineated natural wetland areas, nor ~~be confused~~ within created wetlands that are used to mitigate the loss of natural wetlands.

**B. STORMWATER CONVEYANCE**

**3. ENCLOSED DRAINAGE STRUCTURES**

d. The catch basin or inlet covers should be designed to accept the 10-year design storm. No ponding of water should occur during this storm event. *All catch basins shall include a pretreatment device.*

## **C. ADDITIONAL STORMWATER MANAGEMENT BMPs: INFILTRATION TRENCHES AND SAND FILTERS**

### **1. INFILTRATION TRENCHES**

#### a. Design Criteria for Infiltration Trenches

xi. Underground *and surface* trenches will be readily accessible for maintenance purposes.

c. Infiltration trenches should be located on soils in hydrologic groups "A" and "B" as designated by the U.S. Soil Conservation Service. Where infiltration trenches are proposed, a sufficient number of soil borings will be provided in each location to allow evaluation of site suitability. (For ~~SCS~~ NRCS Soil Hydrologic Groupings, see Appendix J)

## **V. SOIL EROSION, SEDIMENTATION AND POLLUTION CONTROL**

### **A. SOIL EROSION/SEDIMENTATION CONTROL**

#### **1. DURING CONSTRUCTION**

c. iii. The entire site ~~should~~ *shall* be planted with temporary vegetation immediately after mass grading operations.

c. iv. Temporary vegetation and/or mulching ~~should~~ *shall* be used to protect critical areas exposed during development.

c. v. Sediment basins ~~should~~ *shall* be installed and maintained by the proprietor.

d. Areas within open drain rights-of-way that have been cleaned, reshaped or disturbed in any manner will be stabilized with seed and mulch or sod ~~as quickly as possible~~ *rip rap or other suitable erosion control measures within 7 days.*

e. All storm sewer facilities that are or will be functioning during construction will be protected, filtered, or otherwise treated to prevent sediment from entering the system. Construction activities will be completed before the construction of any stormwater management facilities susceptible to clogging (e.g., infiltration trenches) *are constructed.*

### **VI. BUFFER STRIPS**

Buffer strips ~~should~~ *must* be established adjacent to all surface waters through deed restrictions or provisions of master condominium agreements. Buffer strips are defined as zones where construction, paving, and chemical application is prohibited. Plantings capable of filtering stormwater should be established or preserved. Widths shall be determined on a case by case basis, based on such considerations as slope soils, and size of drainage area. *Generally a width of less than 25' will not be accepted.*

### **X. STORMWATER MANAGEMENT SYSTEM MAINTENANCE PLANS**

D. 6. a. Wet weather inspections of structural elements, ~~(including inspection for sediment accumulation in detention basins)~~ should be conducted annually, with as-built plans in hand. These should be carried out by a professional engineer reporting to the responsible agency or owner.

b. Housekeeping inspections, such as checking for trash removal, *(including inspection for sediment accumulation in detention basins)*, should take place at least annually.

**PART III**  
**APPENDICES**

**APPENDIX B**  
**Multiple Pond Systems**

*BMP Fact Sheet #4 should spell out ED – i.e., extended detention; and the drawings should be modified to show a sediment forebay for all plan and cross section designs.*

**SECTION 2**  
**CITY OF ANN ARBOR**

**I. ORDINANCES**

**Chapter 33 – Storm Water System**

**Chapter 47 – Streets**

**Chapter 55 – Zoning**

**Chapter 57 – Subdivision and Land Use Control**

**Chapter 59 – Off Street Parking**

**Chapter 60 – Wetlands Preservation Ordinance**

**Chapter 62 – Landscape and Screening**

**Chapter 63 – Draft Revision Soil Erosion and Sediment Control**

**II. PUBLIC SERVICE DEPARTMENT  
STANDARD SPECIFICATIONS**

**III. RESOLUTIONS**

**Resolution Regarding Public Improvements for New Development**

## CITY OF ANN ARBOR

### **General Recommendations**

#### Chapter 33. Storm Water System

*We recommend that Ann Arbor require pretreatment for all storm water discharges i.e., detention ponds, vegetative swales and catch basin pretreatment devices. This is due to the large amount of phosphorous associated with Ann Arbor's potable water, and the goal of sediment and phosphorus reduction in the Malletts Creek Restoration Project.*

*All irrigation systems should have rain detector shut offs to prevent discharge to the storm water system or be charged a discharge fee.*

#### Chapter 55. Zoning

*The definitions of required setbacks and open space tend to conflict, as setbacks can be considered open space. An example book for each zoning classification would be very useful to developers.*

*Floodplains and other natural features should be added to Chapter 55 as non-development or limited development. Zoning these areas to non-development or limited development reduces regulatory costs, notifies owners of the restrictions, and strengthens the current regulations. Adding a buffer zone to floodplains, woodlands and landmark trees will maximize their protection, increase permeable open space, and provide additional protection from sedimentation and construction errors.*

#### Chapter 59. Off Street Parking

*Reconstruction of parking areas, where on-site surface detention is not available, should require underground detention and pretreatment, with a maintenance plan. In addition, it should be made clear in a guidance document, the provisions for Chapter 63 (5:673) Storm Water Retention Facilities will be required.*

#### Chapter 63. Soil and Sediment Control

*We have reviewed the latest draft, and concur with the changes.*

*We would recommend that a standard be established under Section 5:664 Responsibility of Permittee (6) for the release of total suspended solids, i.e., The permittee shall not release sediment from the site that exceeds 150 parts per million total suspended solids (TSS).*

Note: *(To date, neither EPA nor the State of Michigan has adopted a standard for Non-Point Source TSS. The number above represents 6 times the rate of TSS from a natural site (Schueler 1987) and three times the rate allowed for sewage treatment plant point source discharges.*

*It should be made clear that these provisions apply to redevelopment as well as development.*

#### Public Service Department - Sidewalk Policy

*Consider permeable brick sidewalks unless they present a trip hazard.*

*Decrease sidewalk widths to 4 feet wide, and use only one side of the road in areas with limited bicycle traffic and limited pedestrian traffic.*

*Sidewalks and extensions should be sloped toward the front yard. If not, at a minimum, extensions should be 1" to 2" lower than the sidewalk and curb edge to allow for infiltration of storm water.*

## CITY OF ANN ARBOR

### Specific Recommendations

#### CHAPTER 47. STREETS

##### 4:20. Curb Cuts and Driveway Approaches.

- (4) Design Criteria.
  - (b) (i) Minimum permitted width of openings: ~~10~~ 9 feet.
  - (ii) Maximum permitted width of openings: ~~24~~ 22 feet.
  
  - (c) (i) Minimum permitted width of openings: ~~24~~ 18 feet.
  - (ii) Maximum permitted width of openings: ~~30~~ 24 feet.
  - (iv) Minimum permitted width of one-way drives: ~~15~~ 9 feet.

##### 4:30. Private Street Standards.

- (2) Traveled lanes shall be a minimum of ~~11~~ 9 feet in width.
- (3) The width of a two-way private street shall be a minimum of ~~25~~ 20 feet from the face of curb to the face of curb or ~~14~~ 13 feet for a one-way private street.
  
- (6) A turnaround shall be provided for cul-de-sacs. *The* minimum radius for a circular turnaround at pavement edge shall be 30 feet *and maximum of 35 feet* where no on-street parking is provided, or 44 feet where parking is provided.
  
- (10) A sidewalk system shall be provided which connects to the public walkway system. All private sidewalks shall be ~~at least~~ 4 feet in width.

## CHAPTER 55 ZONING

### 5:51. Natural Feature Open Space.

(3) Definition of “natural feature.” A “natural feature” shall mean a wetland as defined by Chapter 60 of the City of Ann Arbor Code of Ordinances, or a watercourse, as defined in the Land Development Regulations, ~~or both~~ *endangered species habitat, 100 year floodplain, landmark tree, steep slope, woodland, or any or all of the above as defined by Chapter 57 of the Ann Arbor Code of Ordinances.*

(4)(b) An area within a line measured 25 feet from the ordinary high water mark of a watercourse as defined by the Land Development Regulations of the Ann Arbor Code of Ordinances *or from the top of bank which is more restrictive.*

### 5:59. Accessory Buildings.

(1)(d) Accessory buildings may occupy required rear open spaces, *unless it is a natural feature open space*, provided that such buildings do not occupy more than 35% of the required rear open space and are not closer than 3 feet to any lot line.

### 5:77. Lot Accessibility (For Lots Not Fronting on a Public Street).

(1)(a) Driveways serving more than 1 lot must be between ~~10~~ 9 and ~~14~~ 12 feet wide for a one-way drive and between 18 and ~~25~~ 22 feet wide for a two-way drive, except that driveways serving only 1 lot may be between ~~10~~ 9 and ~~25~~ 22 feet wide.

## CHAPTER 57. SUBDIVISION AND LAND USE CONTROL

### 5:121. Area Plans.

(3)(b) The development would limit the disturbance of natural features to the minimum necessary to allow a reasonable use of the land (*Define public nuisance to include flood increases, nutrient and sediment increases*); and

### 5:127. Mitigation of Natural Features.

(3) Mitigation shall be provided on-site. However, where mitigation cannot be accomplished on the site, all or part of the mitigation may be provided on public land within the City if approved as part of the site plan or plat. Plans for off-site mitigation shall be included as part of the site plan or plat approval. (*Use of public land should require some form of payment for future acquisition of public land. Note: Typically, the developer saves the cost of land acquisition, taxes on the mitigation site, and long term maintenance and holding costs. The Public should be reimbursed for some if not all, of these savings.*)

### 5:131. Fees.

(1)(b) If a petition is withdrawn, by written request, ~~before~~ *after* publication of the notice of public hearing by the City Planning Commission, the City Clerk shall reimburse the petitioner 1/2 of the required filing fee.

(c) If the petitioner requests a Planning Commission rehearing ~~after~~ *before* Commission action, the petitioner shall pay *one-half of the entire* original filing fee.

### 5:133. Security for Completion of Improvements.

(3) If improvements have not been completed by the stated date, the Building Director may, after notice to the property owner or owner's designee, revoke the certificate of occupancy and transfer such security to the City general fund. Thereafter the City shall be authorized to go onto the property and complete the construction or installation of uncompleted site improvements in accordance with the approved site plan, plat, land division, or development agreement with the funds available. If the cost to the City for completing the site improvements is less than the amount of the security, the balance, minus the nonrefundable administrative fee, shall be returned to the property owner or designee. If the cost to the City for completing the site improvements exceeds the amount of the security, minus the administrative fee, the City shall bill the property owner or designee for the balance *and shall become a lien against the property.*

(4) Portions of the security amount may be rebated as work progresses, at reasonable intervals, provided that at all times the amount on deposit equals the estimated cost of the work to be completed *+50% to cover contingencies and the administrative fee.*

## **GUIDELINES FOR THE PROTECTION AND MITIGATION OF NATURAL FEATURES**

### **1:4 City Review Process**

(6) Permits. Permits may be applied for at the Building Department after the petitioner has received notice, in writing, of official City approval of plans. Generally the first permit issued will be a grading permit. All natural features protection measures specified in the approved plans must *be* installed and ...

### **1:5 Natural Feature Protection and Mitigation Guidelines**

#### **(2) Floodplains (100-Year)**

Floodplains serve to minimize damage to land and water resources because of their capacity to store water. In so doing they control erosion, silting and contamination of water features and aquatic wildlife. Prior to settlement of the City (1824), floodplains were forested or were wet meadows of several types, and existed in many more locations than now. Healthy, stable plant life is important in determining a floodplain's capacity and function in slowing, filtering, and cooling water moving through them. Floodplains ~~are not a desirable~~ *shall not be a* location for storm water detention facilities.

*Note: When storm water detention facilities are located in floodplains they: reduce the natural storage capacity of the floodplain; and control structures such as dikes and berms are subject to increased failure rate resulting from inundation and saturation.*

#### **(7) Wetlands**

##### **(D) Protection Measures.**

Where wetlands are to be used as a part of a storm water retention system, the *latest* Rules of the Washtenaw County Drain Commissioner (~~April 1996~~) should be followed to minimize negative impacts on the wetlands. Chapter 60 provides requirements for protection of wetlands during construction.

## CHAPTER 59. OFF-STREET PARKING

**Section 5:163(4)** ~~The parking requirements of this Chapter shall not apply to buildings owned or leased by a governmental unit or by a public educational institution as long as they are used for governmental purposes. When such property is conveyed or otherwise made available for a private use, all the parking required by this Chapter for that use must be provided.~~

*Note: We recommend that this section be eliminated unless it is otherwise illegal to do so. By eliminating this section, public developments would have to follow the same rules as private developments and eliminating this section would put a control in place to prevent oversizing of parking areas at public facilities.*

### **5:167. Required Parking.**

Parking for vehicles and bicycles in the amount specified in this section shall be provided on the same parcel as the principal use or on a separate parcel within 500 feet of the principal building if zoned "P" or zoned for the same uses as allowed on the property of the principal use. No lot zoned other than "P" shall have parking as its principal use. An off-site permanent parking easement must be recorded if required parking is provided on another lot. An off-site parking easement must be recorded if required parking is provided on another lot. An off-site parking easement may not include parking spaces or bicycle parking spaces required to keep the other owner's property in compliance with this Chapter. Any fraction of a required parking space or bicycle parking space shall be considered a full space. Required bicycle parking shall meet the design requirements for Class A, B and C facilities provided in Section 5:168.1. Property owners may provide a higher class of bicycle parking facility than is required by this Section. *The number of required parking and bicycle spaces should also be considered the maximum required spaces. Any additional desired or requested spaces may be set aside in landscaped open space, until approved for development, upon proof of necessity.*

### **5:168. Design of Off-Street Motor Vehicle Parking Facilities.**

(3)(b) The width of a driveway serving a single or two-family dwelling shall be between ~~10~~ 9 and ~~24~~ 12 feet. For uses other than single or two-family, the width of one-way driveways shall be between ~~10~~ 9 and ~~15~~ 12 feet, and the width of two-way driveways shall be ~~between~~ 18 and ~~24~~ 22 feet.

(c) All driveways shall lead to a garage, carport, parking space or structure meeting the requirements of this Chapter, or back onto a street by means of the original opening or a second approved opening. A driveway with a width of up to ~~10~~ 18 feet may be installed for single and two-family dwellings on parcels without adequate space for off-street parking.

(5) Parking spaces required by this Chapter shall be ~~at least~~ 9 feet wide and 18 feet long (16 feet long if 2 feet of overhang is provided when parking against a curb). However, up to 30 percent of the parking spaces may be designated as small car spaces, which

shall be at least 8 feet wide and 16 feet long and clearly signed for “small cars”..  
Spaces designated for physically handicapped persons must be at least 12 feet wide.  
Spaces directly adjacent to a physically handicapped persons must be at least 12 feet wide. Spaces directly adjacent to a fence, wall or enclosure shall be increased by one foot in width.

Note: *Overhangs should be grass or a pervious surface.*

## **Stall and Aisle Standards**

### **Regular Size Cars**

**(E)**  
**Aisle**  
**Width\*\***

12'

12'

~~16'~~ 14'

~~23'~~ 19'

~~26'~~ 22'

## **CHAPTER 60. WETLANDS PRESERVATION ORDINANCE**

### **5:208 Departmental Review of Use Permit Application.**

(5) Plans for wetland mitigation shall be reviewed only after the requirements of Section ~~5:213~~ 5:212 of this Chapter have been met.

## CHAPTER 62. LANDSCAPE AND SCREENING

### 5:602. Vehicular Use Area Landscaping and Screening.

(1)(a) A landscaped buffer strip at least ~~40~~ 15 feet in width.

(1)(c) A hedge, ~~berm~~, wall or combination thereof forming a continuous screen at least 30 inches in height above the vehicular use area grade, located in the buffer strip to provide maximum screening of the vehicular use area. Arrangements of shrubs in clusters or groupings is encouraged. Walls shall be set back at least 4 feet from the property line with one 30-inch high shrub provided for every 10 lineal feet, planted on the street side of the wall. Gasoline or service stations shall employ ~~berms~~ or opaque walls between the vehicular use area and the public right-of-way unless the landscape buffer strip provided is ~~15~~ 20 feet in width or greater, in which case a hedge is acceptable.

(1)(d) *All landscape buffer strips shall be 1" to 2" lower than adjacent sidewalks, pavement or curbs to provide infiltration from adjacent or nearby impervious areas.*

(2)(a)

#### Landscape/Vehicular Use Area Ratio

~~1:20~~ 1:10 square feet

~~1:15~~ 1:8 square feet

~~1:10~~ 1:6 square feet

add

(2)(f) *Curb and gutter is not permitted for use in vehicle use areas and any impervious surface shall direct runoff from a minimum distance of 10 feet to the landscape area. Storm water catch basins may be located within the landscape areas.*

### 5:603. Conflicting Land Use Buffers.

(3) A hedge, ~~berm~~, wall, fence or combination thereof forming a continuous screen at least 4 feet high. All gasoline or service stations shall employ opaque walls as the continuous screen.

### 5:606. Materials Standards

(8) Water outlets (hose bibbs) shall be provided within 150 feet of all plant material required by this Chapter if a subsurface irrigation system is not provided. *If a subsurface irrigation system is provided it shall have rain sensing shut off valves.*

(9) Berms shall have slopes no greater than one vertical foot for each 3 horizontal feet and shall have at least 2 feet of flat area on top and shall have adequate protection to prevent erosion. *(We recommend that berms be discouraged in almost all situations.)*

(10) Landscaped areas in and adjacent to vehicular use areas shall be protected by

~~concrete or bituminous curbing~~, anchored bumper blocks, or other durable materials if approved by the Building Official. Wood timbers which are not part of a structural retaining wall shall not be accepted to meet this requirement. Alternative barrier designs which provide improved infiltration or storage of stormwater are encouraged.

**CHAPTER 63. SOIL EROSION AND SEDIMENTATION CONTROL AND STORM WATER MANAGEMENT**

**5:650. Findings.**

The City Council hereby recognizes and is concerned that excessive quantities of soil are eroding from certain areas that are undergoing development for non-agricultural uses such as housing developments, industrial areas, recreational uses, and roads. This erosion makes necessary costly repair to gullies, washed out fills, road, *and* embankments. The resulting sediment clogs storm sewers and road ditches, muddies watercourses and silts-in lakes and reservoirs, and is considered a major water pollutant, which degrades the natural environment within its jurisdiction and is costly to remedy.

**5:652. Definitions.**

- (18) “Impervious Surfaces.” All paved or hard surfaced areas, such as buildings; roads; curb and gutters; dirt, gravel or paved parking areas; sidewalks; bike paths; patios; and any areas of concrete or asphalt or non-absorbent material.
- (30) “Temporary Soil Erosion Control Measures” means interim control measures which are installed or constructed to control *and eliminate* soil erosion until permanent soil erosion control is effected.

**5.653. Compliance with Chapter Required for Site Plan or Plat Approval.**

No site plan, plat, or PUD shall be approved under Chapter 57 of this Code unless said site plan, plat, or PUD shall include soil erosion, sediment control, and storm water management systems consistent with the requirements of this Chapter, related Land Development Regulations, *and the Rules of the Washtenaw County Drain Commissioner “Procedures and Design Criteria for Storm Water Management Systems”*.

**5:655. Permit Exceptions.**

- ~~(3) Public projects or installations which have received written approval from the Building Official.~~

**5:658. Permit Application.**

Application, on a State prescribed form, provided to the applicant by the Building Official, shall be submitted to the Building Official by the owner, developer, or in his absence, an agent authorized by the owner or developer. A separate application shall be required for each grading permit. Three sets of plans, specifications and timing schedules shall be submitted with each application for a grading permit in accordance

with Sections 5:659 and 5:660. The soil erosion and sedimentation control plans shall be designed to effectively ~~reduce~~ *eliminate* accelerated soil erosion and sedimentation. The plans shall be prepared or approved and signed by a professional engineer or by an architect. The Building Official may waive the preparation or approval and signature by the professional engineer or architect when the work entails little hazard to the adjacent property and does not include the construction of a fill upon which a structure may be erected.

**5:659. Application Data Required.**

- (4) A soil investigation report, survey or profile which shall include but not be limited to data regarding the nature, distribution, *erodability, clay content* and supporting ability of existing soils or rock on the site, *in accordance with USDA Soil Survey Standards.*
- (10) A timing schedule indicating the anticipated starting and completion dates of the development sequence and the time of exposure of each area prior to the completion of effective erosion and sediment control measures, including installation and/or removal of all temporary *and permanent* measures as related to construction activities.
- (14) A hydrological study shall be required where the clearing or grading is proposed within a flood plain or other flood prone areas of any lake, pond, stream, watercourse, or wetland.

**5:660. Minimum design standards for water course or wetland erosion and sediment control and storm water management.**

All grading plans and specifications including extensions of previously approved plans ...

**5:664. Responsibility of Permittee.**

- (4) The ~~prompt~~ *daily* removal of all soil, miscellaneous debris or other material applied, dumped or otherwise deposited on public streets, highways, sidewalks or other public thoroughfares during transit to and from the construction, when such spillage constitutes a public nuisance or hazard. The construction of a haul road or other approved vehicle cleaning method may be required by the Building Official to prevent the spread of debris.
- (11) All earth changes being conducted in such a manner which will effectively ~~reduce~~ *eliminate* accelerated soil erosion and resulting sedimentation.

**5:673. Storm Water ~~Retention Facilities~~ Management Systems.**

~~(1) The water retention facilities must have the capacity to temporarily retain the storm water calculated runoff from the developed site from a 12-hour duration storm with a total rainfall of 4.3 inches, less the calculated runoff from the undeveloped site (the site as it exists to site plan or plat approval) from a 12-hour storm with a total rainfall of 3.1 inches.~~

Developments having impervious surfaces greater than 5,000 square feet require detention of the first flush storm event and the 1.5 year/24 hour storm event. Storm water must be filtered through a vegetated swale prior to entering the detention basin. Developments with less than 5,000 sq. feet of impervious surface shall contribute \$2.00 per square foot of impervious area to the storm water utility fund.

(2)(c) All plats, of condominiums, PUDs or site plans must be reviewed and approved by the Washtenaw County Drain Commissioner's Office, and may be required to be established as a county drain, prior to approval by the City.

(6)  
paragraph 2

Existing wetlands shall not be modified for the purposes of Storm Water detention unless it is demonstrated that the existing wetland is low in quality and the proposed modification will maintain or improve its habitat and ability to perform beneficial functions. Existing depressional storage in wetlands shall be maintained and the volume of detention storage provided to meet the requirements of this section shall be in addition to this existing storage.

**CITY OF ANN ARBOR  
PUBLIC SERVICES DEPARTMENT  
STANDARD SPECIFICATIONS**

**DIVISION II**

**DESIGN STANDARDS**

**3. STORM SEWER DESIGN**

**3F. Inlets**

paragraph 4

Inlets and catch basins shall be designed with ~~a two-foot deep sump~~ *a pretreatment device capable of retaining oil and sediment.*

~~Two foot diameter~~ inlets/catch basins directly above a 42" or larger storm sewer may be connected directly to the pipe using a precast tee section, rather than a manhole, *after discharge from a pretreatment device.*

**3G. Footing Drains/Sump Pump Discharges/Downspouts**

As required by the City Council Policy on Footing Drain, Yard Drain, and Downspout Discharges (Resolution No. R-238-5-89, approved May 1, 1989), every site shall be served by ~~an enclosed storm sewer~~ *water management system*, either public or private. Footing drains shall be discharged by gravity, the use of sump pumps, or other means, through leads connected to the ~~enclosed storm sewer~~ *water management system*. Sump pump discharge lines shall not outlet directly to the streets. Sump pump discharge at the surface to a drainage swale located in a dedicated drainage easement may be approved by the Building Director ~~under special circumstances~~, provided that the ~~minimum longitudinal~~ *maximum horizontal* swale grade is ~~2% 4% or greater~~ *but not less than 2%* as required by the Building Director. This surface discharge must be collected by regularly spaced yard inlets before it drains into the ~~public right-of-way~~ *storm water management system.*

Storm sewer leads shall have a minimum of 5 feet of cover. When placed in the same trench as a water service lead, the water service lead shall be a minimum of 1.5 feet above the sewer lead and placed on a shelf of undisturbed soil.

Downspouts shall discharge to grade away from the building, or be connected directly to the storm ~~sewer~~ *water management system*. Downspout discharge shall not outlet directly to the streets *or directly to the storm sewer.*

## 4. STORM WATER RETENTION/DETENTION

### 4B. Location

Storm water ~~retention~~ *detention* facilities shall be located such that they do not encroach upon any existing or proposed public utility easement ~~or~~ , *right-of-way, county drain easement, or floodplain.*

## 7. STREET DESIGN

### 7A. General

paragraph 2

All streets are to be designed with a concrete curb and gutter, 24 inches wide *except as directed by Planning Commission..* The curb and gutter in single and two-family developments shall be mountable roll curb as detailed in the City standard details in **Division X** of these Standards. Streets in all other locations are to have barrier curb as detailed in the City standard details, or MDOT C-4 curb where required by the Public Services Director.

paragraph 4

All streets shall be designed to include 6 inch diameter, flexible, wrapped, perforated, PVC edge drains as indicated in the City standard details. Edge drains shall be connected to all ~~drainage~~ *pretreatment* structures and shall extend a minimum of 100 feet upgrade. Additional edge drain may be required by the Public Services Director based on the condition of the subgrade. The grade of the edge drain is to match the road grade.

### 7C. Right-of-Way and Street Width

#### Street Width (E/E)

24' 18'

28' 22'

33' 28'

33'

(varies)

### 7H. Cul-de-Sacs

paragraph 3

At the bulb of the cul-de-sac, the right-of-way and pavement radii (to the edge of the pavement) shall be 60 feet and ~~45~~ 30 feet respectively, for streets with a 66 foot wide right-of-way at the stem, and 70 feet and ~~55~~ 35 feet respectively, for those with a 70 foot right-of-way at the stem. A landscape island centered in the cul-de-sac bulb with a radius of 20 feet (to the back of the curb) will be allowed, provided that an established association (e.g., condominium association) will maintain the island through a recorded

agreement, such as a site development agreement.

## **8. DRIVE APPROACHES, SIDEWALKS, AND BIKEPATHS**

### **8A. Drive Approaches**

paragraph 6

Provisions shall be made to ensure that ~~excessive quantities of~~ storm water drainage does not drain across the drive approach from the site into the public right-of-way. These provisions shall be subject to the approval of the Public Services Director, and may include inlet structures at the back of the public right-of-way, or grading of the private drive onto the site away from the right-of-way.

### **8B. Sidewalks and Access Walks**

paragraph 1

Sidewalks shall be provided on ~~both~~ *one* sides of all public streets *unless directed to be on both sides by the Planning Commission*. However, the sidewalk may meander within the right-of-way to protect and save trees, slopes, etc. if approved by the Public Services Director.

paragraph 3

All sidewalks and access walks shall be ~~5~~ 4 feet wide. They shall be 4 inch thick Class A concrete, except where crossing concrete drive approaches, where they shall meet the requirements of **Section 8A, Drive Approaches**. The concrete may be placed on native material provided that the material is stable and free of organic or other deleterious material. If the native material must be removed, the concrete shall be placed on a minimum 4-inch thick base of Class II granular material.

paragraph 4

Sidewalks and public access walks are to have a transverse grade of 2% (1/4" per foot), with sidewalks draining ~~toward~~ *away from* the street.

### **8C. Bikepaths**

paragraph 2

Bikepaths shall have ~~8~~ 4 foot minimum width *and shall not exceed 6' maximum width*. They shall be either concrete or asphalt.

paragraph 6

Bikepaths are to have a cross grade of 2% (1/4" per foot) draining ~~toward~~ *away from* the street.

### **8D. Lawn Extensions**

paragraph 2

The lawn extension shall be either sodded, *or* grass seeded, ~~or paved.~~

paragraph 4

The lawn extension shall be graded to drain ~~toward~~ *away from* the street. From the edge of the sidewalk or bikepath for a minimum of one foot, the lawn extension grade shall be 3/8" per foot (3%). The remaining lawn extension shall have a minimum grade of 3/8" per foot (3%), and a maximum grade of 4" per foot (1:3).

*(We recommend that the lawn extension be 1" to 2" below the top of the curb and sidewalk to allow infiltration.)*

**CITY OF ANN ARBOR  
PUBLIC SERVICES DEPARTMENT  
STANDARD SPECIFICATIONS**

**DIVISION VII  
SOIL EROSION AND SEDIMENTATION CONTROL**

**1. GENERAL**

**1A. Purpose**

In accordance with the Michigan Soil Erosion and Sedimentation Control Act (Public Act 347, 1972), the City has adopted an ordinance (Chapter 63 of the City Code) for the purpose of controlling erosion and resultant sedimentation of natural and man-made watercourses and drainage ways. As such, the Contractor shall perform all work in accordance with the Ordinance and provide for the proper disposal of storm water, and the protection of soil surfaces in order to ~~prevent uncontrolled~~ *eliminate accelerated* runoff and erosion.

**1B. Necessity of Grading/Soil Erosion & Sedimentation Control Permit**

A grading/soil erosion & sedimentation control permit must be obtained by the Owner ~~or Contractor~~ responsible for any type of construction resulting in an earth change on a private development project.

The following procedures shall be followed for *all projects within the City*~~projects~~:

- a) Plans and a grading permit application shall be made for all City projects which are located within 500 feet of a watercourse (open County Drain, river, lake, stream, etc.) or involve one acre or more of earth disturbance. ~~This is required by the State of Michigan under Act 347.~~ Upon approval, the grading permit will be issued for the minimum permit fee. In addition, a Wetland and Watercourse Use Permit will be required for any activities within a wetland, watercourse, or buffer area. (See **Division I, Section 1D. Permits** for further information on this permit).

**1C. Additional Requirements**

If a storm water retention/detention facility is to be constructed as part of the permitted project, and water main testing is also required for the project, the retention/detention facility is to be completed, stabilized, and operable prior to the time of water main testing. *or construction of any buildings or parking facilities. If the storm water retention/detention facility is also being used as part of a soil erosion and sediment control plan, it must be cleaned out before being filled to its final water level.*

## 1D. Responsibility of Permittee

- d) The ~~prompt~~ *daily* removal of all soil, miscellaneous debris or other material applied, dumped or otherwise deposited on public streets, highways, sidewalks or other public thoroughfares during transit to and from the construction, ~~when such spillage constitutes a public nuisance or hazard.~~ The construction of a haul road or other approved vehicle cleaning method may be required by the Building Director to prevent the spread of debris.
- e) All earth changes being designed, constructed and completed in ~~such~~ a manner which shall limit the exposed area of any disturbed land for the shortest possible period of time, within ~~the~~ *each* approved construction sequence.
- i) Permanent soil erosion control measures for all slopes, channels, ditches or any disturbed land area being completed within 15 calendar days after final grading or the final earth change has been completed *for each approved construction sequence*. When it is not possible to permanently stabilize a disturbed area after an earth change has been completed or where significant earth change activity ceases, temporary soil erosion control measures shall be implemented immediately. All temporary soil erosion control measures shall be maintained until permanent soil erosion control measures are implemented.
- k) All earth changes being conducted in ~~such~~ a manner which will effectively ~~reduce~~ *eliminate* accelerated soil erosion and resulting sedimentation.

## 2. PERMIT APPLICATION

### 2A. Grading Permit Application Data Required

#### paragraph 3

A legal description ~~or~~ *and* boundary line survey of the site on which the work is to be performed.

#### paragraph 4

A soil investigation report, survey or profile which shall include but not be limited to data regarding the nature, distribution, *erodability*, and supporting ability of existing soils or rock on the site and MDOT soil classifications shall be identified for all fill and backfill material.

#### paragraph 6

Plans, sections and details of all drainage provisions, retaining walls, cribbing, planting, anti-erosion devices or other protective devices to be constructed in connection with, or as part of, the proposed work together with a map showing the drainage area of land tributary to the site and estimated runoff *of the land tributary to the site and* of the area served by any drain.

#### paragraph 7

The estimated total cost of the required erosion control measures *and maintenance*, including dust emission control, during construction.

### 2B. Minimum Design Standards

#### last paragraph

Erosion control measures, which may be used singly or in combination, are shown below together with brief statements of their site adaption or limitations. (The MDNR MDEQ Guidebook of Best Management Practices for Michigan Watershed and the Oakland County Erosion Control Manual should be consulted for standard detail drawings and further information).

#### Sediment Basins

These basins consist of an earth fill type dam and spillway or retention area in a drainage way downstream from a construction area for the purpose of trapping sediment and debris. The basin must have an adequate capacity for retention and sediment must be removed and the basin re-stabilized prior to final grading unless it is part of a permanent soil erosion control plan and is part of the long term maintenance plan.

### **3. REVIEW, INSPECTION AND ENFORCEMENT**

#### **3A. General**

The requirements of Chapter 63 of the City Code shall be enforced by the Building Director. The Soil Erosion and Sedimentation Control Plan shall be reviewed and approved by the Building Director. The Building Director shall approve, disapprove or require modification of an application for an earth change permit within thirty calendar days following receipt of the application. Exceptions to approved standards and specifications may be granted by the Building Director if the alteration or inclusion of other control procedures or measures will improve prevention of accelerated soil erosion and sedimentation during the earth change. The Building Director shall inspect the work unless the Director determines that such inspection requirements may be waived due to the non-hazardous nature of the grading. Soil erosion and sedimentation control measures shall be established prior to ~~mass grading~~ *any earth change*. If the Building Director finds any existing ...

## 4. CONSTRUCTION METHODS

### 4B. Silt Fence

paragraph 3

Post installation shall start at the center of the low point (if applicable) with the remaining posts spaced six feet apart. Posts shall be installed with at least eighteen inches in the ground. Where an eighteen inch depth is impossible to achieve, the posts shall be adequately secured to prevent overturning of the fence due to sediment loading. *The low point of the silt fence shall be reinforced with straw bales, gravel, rock, wire fence or similar materials to prevent failing.*

## **RESOLUTION REGARDING PUBLIC IMPROVEMENTS FOR NEW DEVELOPMENTS**

1. Review and examine all proposed site plans and final preliminary plats for new developments and require that all necessary public and private on-site improvements be shown on site plans and plats- , *and that these improvements shall be constructed to City Standards by the developer as part of the development.*
3. If any of the above off-site public improvements are determined to be inadequate based upon City ordinances and regulations, then methods of providing adequate facilities shall be determined along with an estimate of cost, sources of funding, and possible timing and reported to the City Planning Commission and City Council. *Extension and improvement of storm sewers to meet the needs of the new development shall be at the expense of the developer.*

**SECTION 3**  
**PITTSFIELD TOWNSHIP**

**SOIL & SEDIMENTATION CONTROL**

**LAND DEVELOPMENT STANDARDS**

- Chapter 1 – Purpose of Standards**
- Chapter 2 – Plan Requirements**
- Chapter 5 – Storm Drainage**
- Chapter 6 – Grading, Drainage & Erosion Control**
- Chapter 8 – Sidewalks**
- Chapter 9 – Parking Lots**
- Chapter 15 – Landscaping**
- Chapter 16 – Occupancy**

**ZONING ORDINANCE**

**DRAFT ORDINANCE – Chapter 19**

**25.500 SOIL AND SEDIMENTATION CONTROL  
PITTSFIELD CHARTER TOWNSHIP, MICHIGAN**

**25.502 Sec. 2. Definitions.**

- (2) ACCEPTABLE OPERATING EROSION AND SEDIMENT CONTROL PROGRAM means an erosion and sediment control program ~~conforming to the standards and specifications for soil erosion and sediment control as promulgated and adopted January 9, 1970 by the Washtenaw County Soil Conservation District which are hereby adopted by reference as a part of this Ordinance conforming to the Washtenaw County Soil Erosion and Sediment Control Ordinance, 1997, that temporarily and permanently eliminates accelerated erosion and off site sedimentation.~~
- (9) *SEDIMENT* means soil or other solid particulate matter, mineral or organic, that has been deposited in water, is in suspension in water, is being transported, or has been removed from its site of origin by the process of soil erosion.
- ~~(9)~~ (10) SOIL EROSION means ...
- ~~(10)~~ (11) STABILIZATION means ...
- ~~(11)~~ (12) TEMPORARY EROSION CONTROL MEASURES means ...
- ~~(12)~~ (13) TOWNSHIP means ...

**25.503 Sec. 3. General Requirements.**

- (2) All persons engaged in earth change activities, in the Township, shall design, implement and maintain erosion and sedimentation control measures which effectively *eliminate* ~~prevent~~ accelerated erosion *and sedimentation*.

**25.504 Sec. 4. Erosion and Sedimentation Control Plan.**

- (2) The erosion and sedimentation control plan shall be designated to ~~prevent~~ *eliminate* accelerated erosion and sedimentation and shall make available or include all factors which may contribute to erosion and sedimentation. The plan shall include but not be limited to the following:
- (a) A location map with a legal description including the proximity of proposed earth changes to any lakes and streams, *wetlands or natural features* at a scale of not more than 200 feet to the inch.
- (d) ~~A soils survey map or a written description~~ *Soil borings and written description* showing the soil series or texture, depth, natural soil drainage *and erodability* and a real extent of soils *in accordance with the U.S. Department of Agriculture NRCS soil classification system.*

**25.506 Sec. 6. Control Procedures.**

- (2) Sediment shall be removed from runoff before it leaves the site of the earth change activity *to less than 150pp million TSS.*
- (5) Where it is not possible to permanently stabilize a disturbed area immediately after an earth change has been completed or where the activity ceases for more than ~~30~~ 7 days, interim stabilization shall be implemented within 5 days. All interim measures shall be maintained until permanent stabilization is effected.

**25.507 Sec. 7. Control Measures.**

add

(r) *Any other measures necessary to eliminate accelerated erosion and sedimentation.*

**25.509 Sec. 9. Application for Permit.**

- (1) Applications for permits shall be submitted to the enforcing agency by a person undertaking an earth change. In the case of land development, the application shall be submitted by the land ~~developer~~ *owner* rather than the contractor or agent.

**25.510 Sec. 10. Bond Requirements.**

- (1) A permit for an earth change within the Township shall not be ... surety. The bond shall be in a form approved and furnished by the enforcing agency, and in the amount of the cost of the work set forth in the plan as estimated by the said architect or engineer, provided such amount is approved by the enforcing agency; otherwise such estimate shall be made by the enforcing agency and the bond shall be in the amount thereof; ~~Provided further, that the enforcing agency is authorized to waive all or any part of the amount of such bond to the extent that the enforcing agency determines the same unnecessary to assure compliance with the conditions set forth in Section 10(2), and assure the installation and completion of the work set forth in said plan.~~

- (4) *Note: (We recommend that language be adopted that makes any amounts expended in excess of the bond, a lien against the property.)*

**25.512 Sec. 12. Permit Requirements.**

A land owner or developer who contracts for, allows or engages in an earth change within the Township shall obtain a permit from the enforcing agency prior to commencement of an earth change which is connected with any of the following land use activities which disturb one or more acres of land, or if the earth change is within 500 feet of a lake ~~or~~, *wetland, stream, storm water inlet, ditch, or other water conveyance* within the township.

**25.513 Sec. 13. Building Permit, Certificate of Occupancy, Site Plan and Plat Approval.**

- (1) The Township building inspector shall notify the enforcing agency upon receipt of an application for a building permit involving an earth change which affects one or more acres of land. The building inspector shall not issue a building permit or certificate of occupancy to those persons engaged in any earth change for which an enforcing agency permit is required, ~~and not issued.~~ *until the enforcing agent has certified completion of all permanent erosion control measures.*

**PITTSFIELD TOWNSHIP  
LAND DEVELOPMENT STANDARDS**

**CHAPTER 1  
PURPOSE OF STANDARDS**

*Note: While we have made some recommended changes in this section, it is our finding that the November 1997 Draft Rules of the Washtenaw County Drain Commissioner – Procedures and Design Criteria for Storm Water Management Systems are very well done, readable and with good design drawings and they should be considered for adoption by the Township.*

**CHAPTER 2  
PLAN REQUIREMENTS**

**2.02 Information Required for Preliminary Site Plans**

- (g) Soils information for *all sites including boring data, NRCS soils, description, erodability, and clay content* utilizing on-site septic tanks and drain fields; location and extent of soils that are un-buildable in their natural state because of organic content or water table level.
- (i)(4) lot area, in acres and square feet, excluding existing road right-of-way as well as that in proposed rights-of-way, *existing and proposed road rights-of-way and their impervious surfaces will be provided as separate calculations;*
- (s) ~~The Planning Commission may require~~ a site analysis ~~where it is necessary~~ to evaluate the design and development potential of the site, to identify the nature and the effect on design and development of existing conditions for the site, ... by text.

**2.03 Information Required for Final Site Plans**

- dd) Evidence of approval by:  
Michigan Department of Natural Resources *and Environmental Quality* – wetlands, lakes, streams, dams, floodplain, *endangered species*

**2.04 Information Required for Preliminary Plats – Tentative Approval**

- add
- (v) *all applicable information required in 2.02 preceding.*

## **CHAPTER 5 STORM DRAINAGE**

### **5.02**

c) ~~Detention/~~Retention ponds.

### **5.03**

d) Michigan Department of Natural Resources (MDNR) *and/or Michigan Department of Environmental Quality (MDEQ)*.

### **5.13**

add

f) *All street catch basins shall have a pretreatment device as part of their design.*

### **5.17**

Upon improvement of all sites capacity must be provided for the ~~temporary retention~~ *detention* of stormwater runoff from a 100-year storm. *The bankfull flood: The 1:5-year 24 hour storm and the "first flush": The first 0.5 inch of runoff from the entire contributing watershed.*

### **5.18**

Methods of providing for ~~the stormwater retention~~ *detention* include, but are not limited to, the following:

a) Deep permanent lake, *and wet detention pond.*

b) Landscaped shallow dry ~~retention~~ *detention* pond.

add after f)

*All of the above must provide for sediment capture and maintenance removal.*

### **5.20**

d) Have a discharge for ~~either normal use and~~ emergency use.

### **5.21**

b) Discharge by gravity from *one foot above* the lowest elevation of the pond.

c) Have ~~sodded~~ riprapped or concreted channels to direct flow.

### **5.22**

For all methods of retention, other than deep permanent lakes, the discharge shall be ~~at~~ *from* the lowest elevation of the pond. Discharge must be by gravity. Pumping will not be permitted.

**5.25**

Natural wetlands may *not* be used as storm water retention *or detention* ponds. ~~However, they must be preceded by sedimentation traps and/or basins.~~ All activity in or discharge into regulated wetlands must be approved by the ~~MDNR~~ MDEQ.

**5.26**

It shall be generally unacceptable to provide stormwater retention *or detention* in a required front yard setback or the setback required adjacent to a public or private street.

**5.30**

Easements shall be provided to the appropriate authority for all storm sewers, *detention ponds, sediment forbays and other storm water management devices.*

**CHAPTER 6  
GRADING, DRAINAGE, AND EROSION CONTROL**

**6.06**

Proposed grades shall generally not exceed a slope of 1 on ~~4~~ 5.

**6.11**

The longitudinal grade of rear yard drainage shall not be less than 0.5 of one percent (0.5%) and the length of run shall not exceed four hundred and fifty feet of continuous drainage without an outlet to a ~~street catch basin or to a~~ rear yard in *let of the storm water management system.*

**6.13**

d) Proposed drainage arrows *and elevations.*

f) ~~Finished~~ basement *and crawl space elevations, if applicable.*

**6.14**

Grading around and in retention *or detention* basins shall meet the following minimum requirements:

a) No building may be closer than 20 feet from the ~~100~~ 500-year high water elevation, measured horizontally.

*Note: we recommend c) and d) include the safety features and slopes found in the Schueler designs found in the Appendices of the 1997 Draft Rules of the Washtenaw County Drain Commissioner.*

## **CHAPTER 8 SIDEWALKS**

### **8.01**

Sidewalks shall have a minimum clear width of ~~five~~ *four (4)* feet and shall be constructed of Portland cement concrete. When they abut perpendicular parking *with overhang over the sidewalk*, sidewalks shall have a minimum of six feet.

### **8.02**

Sidewalks shall be at least 4 inches thick, except at driveways where they shall be at least 6 inches thick. They shall be laid on a 4 inch thick sand base *and sloped toward the front yard*.

## **CHAPTER 9 PARKING LOTS**

### **9.03**

The surface area of parking lots shall be landscaped to provide visual and climatic relief from pavement surfaces and to channelize and define logical areas for vehicular and pedestrian circulation. Each parking lot shall provide a minimum of ~~5~~ *10* percent of the lots paved surface area for the purpose of planting shade trees and other landscape materials. Greater than ~~8~~ *10* percent interior landscape area may be required by the Planning Commission where needed to provide visual and climatic relief.

### **9.06**

Islands required in parking lots shall have a minimum width of 10 feet and shall be landscaped. Surfaces of islands shall be grass, other ground cover, or low growing shrubs. *Surfaces shall be 1" to 2" below the pavement edge and shall provide for drainage to the island of at least a 10 foot perimeter.*

### **9.08**

Parking spaces shall be at least ~~10~~ *9* by ~~20~~ *18* feet in dimension, except where the zoning ordinance permits smaller spaces, and except barrier free spaces, which shall be provided in accordance with the barrier free design rules of the State of Michigan Bureau of Construction Codes. Parking spaces which abut sidewalks or landscape areas may be reduced to not less than ~~18~~ *16* feet in length, to allow for vehicle overhang. However the total space available for the vehicle shall not be less than ~~20~~ *9 feet wide by 18 feet long.*

### **9.09**

Driveways between parking bays intended for two-way flow shall have a minimum width of ~~22~~ *20* feet.

**9.19**

Large parking lots should be divided into smaller units by landscaped areas, ~~earth berms~~, elevation changes or architectural features. Major drives shall be physically separate from parking spaces.

**CHAPTER 15  
LANDSCAPING**

**15.03**

g. Irrigation system plan for watering and draining landscape areas. *Permanent irrigation systems must be fitted with rain sensing shut off valves. Wherever possible, irrigation water should come from detention basins.*

**15.04**

Plant materials shall be installed in a sound, workmanlike manner, and according to acceptable planting procedures. All plant materials shall be maintained in a healthy and growing state. All landscape elements such as, but not limited to, fences, screens, walls, or lighting shall be kept in good repair. All landscaped areas shall be maintained by pruning, trimming, weeding, clearing of undergrowth, fertilizing with *non-phosphorus fertilizer*, and watering at intervals necessary to promote optimum growth and health.

**15.05**

- a. Plant and grass materials shall be of acceptable varieties and species, hardy in Washtenaw County, and shall conform to the current minimum standards of the American Association of Nurserymen, and shall have passed any inspections required under State or Federal regulations. *Species native to Michigan should be used whenever possible.*
- c. Canopy (deciduous) trees shall be species having an average mature crown spread greater than 15 feet and a mature height of 40 feet or more in Washtenaw County and having trunks that can be maintained with over 5 feet clear stem if conditions of visibility require, except however, at street intersections, where at least 8 feet stem clearance will be required. Deciduous tree species shall be a minimum of 10 feet overall height or a minimum caliper of 2 1/2 inches immediately after planting. *Species native to Michigan should be used whenever possible.*

**15.13**

add

b. *Provide for infiltration and evapotranspiration of parking lot runoff.*

~~b~~ c.

e. d.

~~d~~ e.

**CHAPTER 16**  
**CONSTRUCTION AND OCCUPANCY**

**16.01**

- c. All facilities for the direction and retention of stormwater shall be ~~substantially~~ complete. Site grading shall be generally complete.

add

- g. *All temporary soil erosion measures are in place and functional.*

**16.05**

add

- j. *All permanent soil erosion measures are complete and functional.*

**PITTSFIELD TOWNSHIP  
ZONING ORDINANCE**

**ARTICLE 2.0 DEFINITIONS**

**PARKING SPACE:** One unit of a parking area provided for the parking of one automobile. This space shall have an area of not less than ~~two hundred (200)~~ *one hundred sixty two (162)* square feet, and shall be exclusive of curves, driveways, aisles or entrances giving access thereto and shall be fully accessible for the storage or parking of permitted vehicles *unless for handicapped parking*.

**ARTICLE 10.0 RC – RECREATION CONSERVATION DISTRICT**

**SECTION 10.01 PURPOSE**

The value to the public of certain open areas of the Township is represented in their natural, undeveloped or un-built condition. It is recognized by this ordinance that the principal use of certain open areas is, and ought to be, the development, management and utilization of the natural resource base possessed by these areas. In order that this value be maintained and this use encouraged, this ordinance has established, based upon a well considered plan, a zoning district designed to regulate the location of buildings and structures and the use of parcels and lots, in order to protect and enhance the natural resources, *natural features*, natural amenities, natural habitats of wildlife, water shed and reservoir areas, agricultural capabilities, public recreation areas, and the public health, safety and welfare by reducing the hardship and financial burdens imposed upon the Township by the wanton destruction of resources, the improper and wasteful use of open land and wooded areas, and the periodic flooding and overflow of creeks and streams.

**SECTION 10.02 PERMITTED USES**

- C. Public and private conservation area and structure for the development, protection and conservation of open space, *natural features*, watersheds, water, soil, forest and wildlife resources.
  
- G. The growing, stripping and removal therefrom of sod, provided that said lot or portion thereof shall be re-seeded after stripping by fall of the year in which it was stripped ~~so~~ to reduce the actual or potential erosion of soil by water or wind *and other soil erosion measures are in place prior to the stripping or removal of the sod*.

## **ARTICLE 36.0 PLANNED SHOPPING CENTER DISTRICT**

### **SECTION 36.10 – REQUIRED OFF-STREET PARKING**

The parking area shall be divided by landscaped islands or medians for the purpose of channeling traffic flows, breaking up the visual impact of large paved areas, reducing heat and glare from paved surfaces, and improving the attractiveness of the shopping center. The location of landscape islands and medians shall be shown on the preliminary plan. Landscape islands shall be planted in accordance with the approved landscape plan. All landscaped islands shall be defined by concrete ~~curbs~~ *parking bumpers*. *A maximum of 4.5 spaces per 1,000 sq. ft. of gross floor area will be allowed. The site plan may include up to an additional 50% expansion of parking spaces provided said spaces are initially developed as landscaped open space. The Planning Commission may approve all or part development of these additional spaces upon proof of necessity.*

### **SECTION 36.16 – INFORMATION REQUIREMENTS**

- B.13. Proposed parking and loading – location and dimensions of lots, spaces, aisles, islands and medians; angle of spaces; number of spaces; ~~and~~ surface type; *and justification for any parking in excess of maximum allowed.*

## **ARTICLE 45 PUD – PLANNED UNIT DEVELOPMENT DISTRICT**

### **SECTION 45.04 – DENSITY REGULATIONS**

- B. 3. The surface area of *natural features*, lakes, streams, ponds (natural, manmade, or storm water retention), ~~marshlands~~, *wetlands*, and similar areas *and their buffer strips*, may be included in the acreage used for calculating density if at least fifty (50) percent of the frontage of such areas are part of lands devoted to parks and open space used for ~~and~~ *and* accessible to residents of the PUD.

### **SECTION 45.06 – REQUIRED YARDS**

- E. A transition strip at least twenty (20) feet wide shall be required along a perimeter of a commercial, warehousing, office, or industrial site where adjacent to a residential area, school site, park and similar areas within a PUD. Such strips shall be landscaped with trees, shrubs, ground cover, and other plant materials. Fencing may be required at the option of the Township Board at the time of area plan approval, *and a transition strip of 25' shall be required around natural features, lakes, streams, ponds (natural, man made or storm water detention), wetlands or other similar areas.*

## ARTICLE 51.0 OFF-STREET PARKING AND LOADING-UNLOADING REQUIREMENTS

### SECTION 51.01 – OFF-STREET PARKING

D. Each off-street parking space for automobiles shall not be less than ~~two hundred~~ (200) *one hundred sixty two (162)* feet in area, with a minimum width of ~~ten (10) nine (9)~~ feet, exclusive of access drives or aisles, and shall be of usable shape and condition. There shall be provided a minimum access drive of ~~ten (10) nine (9)~~ feet in width, and where a turning radius is necessary, it will be of such an arc as to reasonably allow an unobstructed flow of vehicles. Parking aisles for automobiles shall be of sufficient width to allow a minimum turning movement in and out of a parking space. The minimum width of such aisles shall be:

1. For ninety (90) degree or perpendicular parking the aisle shall not be less than ~~twenty-two (22)~~ *twenty (20)* feet in width.

#### G. 4. Barber Shops and Beauty Parlors:

~~Three~~ *Two* spaces for each chair or service station (such as a barber, beauty or manicure chair), plus one space for any unattended station (including, but not limited to, a tanning booth).

Offices:

Business and professional; Banks:

~~One (1)~~ *Three (3)* spaces for each ~~two hundred fifty (250)~~ *1,000* square feet of floor area.

Shopping centers:

~~Five~~ *Four and one-half (5.5) (4.5)* spaces per thousand (1,000) square feet of gross leaseable floor area.

### SECTION 51.02 – LOADING-UNLOADING REQUIREMENTS

add

- I. *The minimum required should be considered to also be the maximums. However, additional expansion parking space may be dedicated provided it is first developed as landscaped open space. After two years the Planning Commission may consider expanded parking after proof of necessity.*

## ARTICLE 52.0 PLANNING AND DEVELOPMENT REGULATIONS FOR PLANNED UNIT DEVELOPMENT (PUD) DISTRICT

### SECTION 52.04 – OPEN SPACE REGULATIONS

D. The Township Board may require, upon recommendation of the Planning Commission, that natural amenities such as but not limited to, *natural features*, ravines, rock outcrops, wooded areas, tree or shrub specimens, unique wildlife habitat, ponds, streams and ~~marshes~~ *wetlands* be preserved as part of the open space system.

### SECTION 52.07 – PETITION REQUIREMENTS

B. 1.

- j. General topography; soil information, *including erodability of soils.*

add

v. *Existing natural features, lakes, streams, ponds, waterways, floodplains and similar features.*

#### **SECTION 52.11 – COMMON AREAS AND FACILITIES**

B. All public areas and facilities which are to be dedicated to a public agency shall be so dedicated prior to approval of a final site plan or a final plat, unless a binding agreement is provided in lieu of dedication. *Complete and finished development of the public areas and facilities must be accomplished before a certificate of occupancy will be granted.*

#### **ARTICLE 55.0 SITE PLAN REVIEW**

##### **SECTION 55.01 – PURPOSE**

It is recognized by this ordinance that there is a value to the public in establishing safe and convenient traffic movement to higher density sites, both within the site and in relation to access streets; that there is a value in encouraging a harmonious relationship of buildings and uses both within a site and in relation to adjacent uses; further that there are benefits to the public in conserving natural resources *and natural features*. Toward this end, this ordinance required site plan review by the Township Planning Commission and approval by the Township Planning Commission for certain buildings and structures that can be expected to have a significant impact on natural resources, traffic patterns, on adjacent land usage, and on the character of future urban development.

## **SECTION 55.14 – SITE PLAN COMPLETION GUARANTEE**

- B. Site improvements shall mean, but shall not be limited to drives and streets, curbs and gutters, sidewalks, drainage facilities, final grading, retaining walls, landscaping, screening or fencing, and paving, ~~and~~ stripping of parking lots, *storm water detention facilities, and permanent soil erosion measures.*

## **ARTICLE 56.0**

### **SUPPLEMENTAL REGULATIONS**

#### **SECTION 56.05 – ACCESS TO PUBLIC STREET**

- C. 3. c. Pavement of three (3) inches of bittuminous aggregate, #1100 mix, applied in two lifts; ~~twenty-four (24)~~ *twenty-two (22)* feet wide.
- C. 3. d. A turnaround area with a seventy-five (75) foot radius right of way and a ~~50~~ 35 foot radius roadway surface where application.
7. A right-of-way and roadway shall be adequately arranged so as to convey runoff water to ~~existing drainage courses or water bodies~~ *the designed storm water management system.* Discharged water shall not be cast upon the land of another property owner unless the water is following an established drainage course. Connection to county drains shall be approved by the Washtenaw County Drain Commissioner. Connection to roadside ~~a~~ ditches within public road right-of-ways shall be approved by the Washtenaw County Road Commission.

#### **SECTION 56.10 – FLOOD HAZARD REGULATIONS**

F. add

3. *Private storm water detention facilities may not be located in flood hazard areas.*

G. 1. Encroachments, including fill, new construction, substantial improvements, and other development shall be prohibited in a floodway. Exceptions to this standard shall be made only upon certification by a professional engineer registered in the State of Michigan, or by the Michigan Department of ~~Natural Resources~~ *Environmental Quality*, in cases in which the department has jurisdiction, that the encroachment or other development will not result in any increase in flood levels during the discharge of base flood, and that the encroachment or other discharge complies with Act 245, Public Acts of 1929, as amended by Act 167, Public Acts of 1968.

#### **SECTION 56.14 – PLANNING AND DEVELOPMENT REGULATIONS FOR MOBILE HOME PARKS**

I. 21. a. Existing and proposed water mains, sanitary and storm sewers *and storm water detention facilities* in the area including sanitary sewer service areas; the road network in the area;

23. add

- L. *Mobile Home Parks are not permitted in floodplains.*

#### **SECTION 56.16 – QUARRIES AND SAND AND GRAVEL PITS**

- F. Such removal shall not be conducted as to cause the pollution by any material, *including soil and sediment*, of any surface or subsurface water course or body outside of the lines of the lot on which such use shall be located.
- K. The operator or operators shall file with the Township Planning Commission and the County Health Department a detailed plan for the restoration of the development area which shall include the anticipated future use of the restored land, the proposed final topography indicated by contour lines of not greater interval than ~~five (5)~~ *two (2)* feet, steps which shall be taken to conserve topsoil; the

type and number per acre of trees or shrubs to be planted and the location of future roads, drives, drainage courses, and/or other improvements contemplated.

**PITTSFIELD TOWNSHIP  
(DRAFT)  
CHAPTER 19  
PROTECTION AND MITIGATION OF NATURAL FEATURES**

**19.04 Natural Features Protection and Mitigation Guidelines**

**A. Wetland**

paragraph 2

Pittsfield Township will follow the rules and guidelines of the Michigan Department of Environmental Quality (MDEQ) for the determination of regulated wetlands. Wetlands that do not meet the criteria of ~~determination~~ *being regulated* by the MDEQ, but are determined by the Planning Commission to be supporting or interconnected with other natural features will be regarded ~~in comparable fashion to~~ *as a part of the natural features* ~~regulated wetlands~~. In general, the types of wetlands that would *be* categorized as such would be those areas located in or near woodlands, or providing connections between woodlands.

1. b. Those wetlands of special significance, such as forested wetlands and wetlands along watercourses with native plant associations still intact or regenerating, shall be given considerable weight as to the benefit gained by the Township if protected from development and/or the affects of development. Therefore, the Township may consider additional review and protection when presented with ~~the~~ *an* encroachment into this type of wetland or proximity thereof.

c. Wetlands may *not* be used as storm water retention *or detention* ponds, *except as indicated in d and e below*. However, when “natural wetlands” are used in this way they will be protected from damaging modifications and adverse changes in runoff quality and quantity associated with land developments *and pretreatment of storm water will be required*.

d. ~~Disturbed~~ wetlands, ~~such as those wetlands converted to farmland~~ (often identified by the presence of hydric soils), present genuine opportunity to restore some of the capacity and function and diversity of species that once occurred. Restoring, ~~maintaining~~ and enhancing the biological and hydrological value and function of these wetlands is a primary concern. ~~For use of these wetlands as stormwater retention or detention facilities see subsection “c”, this section~~ *may be permitted*.

e. In cases where wetlands have been greatly damaged, losing both capacity and ability to function naturally, replacement or relocation is an acceptable alternative to eliminating the wetland. If these lands are to be used as part of the proposed development, they may be effectively utilized and used and managed for storm *retention or detention* and filtration (~~See subsection “c”, this section~~).

2. a. The mitigation plan provides for substantial replacement of the predominant values of the wetland to be lost.

c. Only if on-site mitigation is not practical and/or beneficial, then mitigation in the immediate vicinity, within the same watershed of the permitted activity, may be considered. When considered elsewhere the mitigation must meet the same general conditions of predominant values and be beneficial.

e. All mitigation plans must meet all standards and requirements and be approved by the MDEQ.

**A. Watercourses**

Watercourses are to be defined as any natural or artificial stream, river, creek, ditch, channel, canal, waterway, ~~gully or ravine~~ in which water flows in a definite direction or course, either continuously or intermittently, and has a defined bed and banks.

1. a. Efforts shall be made to preserve watercourses in a natural state and to avoid stormwater and sedimentation that may damage the watercourse. Controlling storm water in watersheds will ensure that watercourses are not damaged and eroded during storm events. Development alternatives shall be explored that will ~~reduce~~ *eliminate* the adverse impacts of both storm water and sedimentation.

c. A permanent buffer strip, vegetated with natural plant species, will be maintained and/or restored within twenty-five (25) feet setback from the designated edge of any ~~watercourse~~ *natural feature*. Building, grading, or other construction activity requiring Township building permits shall be setback at least one hundred (100) feet from the designated edge of any watercourse. ...

The setback of 100 feet is provided to ensure that on-site run-off into watercourses is filtered naturally and to maintain a corridor for wildlife along ~~stream ways~~ *watercourses*. The setback, however, may vary depending on site-specific characteristics such as soil types, slopes, vegetation and the size and hydrology of the watercourse. Alternatives to the 100-ft. setback must be described and justified in the natural features protection plan.

When watercourses are crossed, efforts must be made to ensure that the crossing ... Crossing locations shall be kept to the minimum necessary to provide access and must be permitted by the MDEQ.

d. Urbanized above-ground watercourses are those that *have been modified by human activity, no longer have much of a natural character*, but which nonetheless have not been placed in a storm drain beneath the ground. Even though these watercourses may or may not have similar characteristics or associated natural features surrounding them as do other watercourses, they are nonetheless connected in some manner to the overall system of watercourses. Effort to control erosion, sedimentation and contamination problems is required. Whenever possible, development projects shall incorporate restoration of these watercourses and any associated natural features in order to provide connections and corridors between features.

e. Underground (~~pipel~~) ~~watercourses~~ *storm sewers* are directly related to major storm drains, and are often quite easy to find after storm events. ... The planning phase of the project shall recognize that these watercourses *storm sewers* are connected to ~~surface~~ drains or *watercourses*. Therefore, storm water and peak flow rates in the ~~watercourse~~ must be ~~addressed~~ *considered and storm water management plans developed to eliminate increases in storm water runoff, sedimentation and other pollutants*.

g. Every development project shall evaluate the potential damage to nearby watercourses during the design, construction, and implementation phases ~~to minimize and the plans submitted for approval must eliminate~~ problems associated with surplus storm water, sedimentation, and contamination.

### C. Floodplains

1. a. *Undeveloped* floodplains are vital ~~open spaces~~ *areas* that protect downstream properties from flood damage and control soil erosion and contamination of the watercourse. All buildings must be built above the 100-year floodplain elevation and there shall be no loss of flood capacity due to filling or grading of the site. Proper soil erosion and stormwater control measures shall prevent ~~unfiltered~~ *increased* runoff into the floodplain, *eliminate sedimentation of the floodplain and prevent pollution of the floodplain*.

b. *There shall be no disturbance to surface and subsurface hydrological regimes.*

cc. ~~Forested~~ floodplains dominated by exotics, including black alder, willows, and poplars, ~~and floodplain meadows dominated by~~, cattails or purple loosestrife may not be viewed as having ~~an~~ as important biological value as would an area dominated by native species. ~~However,~~ even though of a lesser biological value on the whole, the vegetative cover is still vital to the continued function and capacity of the floodplain. ~~And should be left undisturbed. Whenever possible~~ These areas shall be left undisturbed. ~~In some cases,~~ Restoration of those areas that are dominated by exotics with native plants ~~could be useful in enhancing the function, appearance, and biological value of the floodplain~~ *is encouraged and may be permitted*.

e. *In cases where riparian habitats exist, but are being invaded by non-native species, every reasonable effort shall be taken to restore the habitat as part of a development proposal.*

*D. Woodlands*

*Replace entire paragraph with this wording:*

*Woodland. A forested area of 1/4 acre or more with a gross basal area of 30 square feet per 1/2 acre, containing 20 trees per 1/4 acre greater than 6 inches in diameter at breast height (DBH).*

*A grove, forming one canopy, of at least 10 trees with a DBH of 10 inches or more is also a woodland.*

#### *F. Heritage Trees*

Individual trees of importance can also qualify as natural features. These are considered heritage trees by the Township and include trees that are distinctive because of their age, size, type and historical significance. In general, any tree with a DBH of 24-in. or larger can be categorized as a heritage tree. Below is a list of specific trees that are defined and categorized as heritage trees upon attaining a certain DBH size and therefore *are* of special value to the Township.

4. b. All construction activity *on the site*, including grading changes in the area that effect soil moisture and drainage patterns, ~~shall be, in general, excluded from the CRZ of heritage trees and the CRZ for trees located along the woodland perimeter shall be excluded.~~ Proposed exceptions must be described and justified in the natural features protection plan. The applicant must explain why the exception is a necessity for the development of the site.

c. A number of construction techniques help save trees by protecting CRZ of heritage trees in the development disturbance area and at the boundaries of woodlands. These include protective and barrier fencing at the CRZ to prevent compacting of soils by heavy equipment and vehicular traffic, placing gravity utilities under pavement and avoiding placement under trees; and tunneling utilities under trees and the CRZ instead of trenching. ~~The use of fill within this zone is especially discouraged. If fill is proposed it shall be fully described and justified in the natural features protection plan.~~

e. Clearing for buildings shall be strictly minimized to the least area needed to work around buildings ~~particularly if woodlands or heritage trees are present.~~ Excavated spoils from basements and other needed grading shall not be located in the woodland area or around heritage trees ~~within 25 feet of natural features.~~ ~~Very careful handling of~~ Protection of trees near the building envelope shall be undertaken to the fullest extent possible.

g. Generally speaking, an occasional large native tree or heritage tree is found among exotic trees and shrubs. This is often found in agricultural areas where single or small groups of trees have been retained ~~in the fields, eventually forming islands of woodlands.~~ These same fields are targeted for development. ~~and~~ The presence of the woodlands ~~these trees~~ should be taken into account as part of the development. ~~In some cases and where appropriate, such woodlands provide an opportunity for restoration to native species.~~

h. Any protected woodlands or heritage trees that are determined by a certified Arborist to be dead, dying or severely damaged due to on-site construction activity within 3 years after issuance of a certificate of occupancy or final permit approval for development authorized by an approved site plan or plat shall be replaced by the applicant. The applicant or property owner shall provide a combination of ~~native~~ trees *native* to Michigan equal to a 100 percent of the DBH of the tree that is lost. ...

#### 2. Mitigation

a. In general, woodlands should not be removed for new developments. When woodlands are ~~be~~ removed as agreed to by the Planning Commission, the removal shall be mitigated by the installation of replacement trees for woodland trees 8-in. or larger in diameter, or by the creation of an area planted with comparable *native* trees and ~~plat native plant~~ associations. The creation of this area must be agreed to by the Planning Commission. Heritage trees shall not be removed for development, except under the most extreme of extenuating ~~site~~ circumstances. Site design shall consider any heritage tree on a site an important design element. Removal shall be explained in the natural features plan ~~if there are no feasible alternatives.~~ ~~and shall occur rarely and considered only after alternatives are studied and found not to be feasible.~~

b. Replacement of woodland trees and heritage trees shall ~~include the most appropriate,~~ *be* non-invasive species ~~as part of the project design.~~ Replacement requirements include using *at least 70%* species native to Michigan and ~~include~~ using a diversity of species and sizes (but not below the minimum sizes listed

below). For woodlands ...

f. Replacement trees need a chance to become as great as the trees they replace. Genuine concern for soils and cultural needs of new plants shall be a part of the design process. Many species of trees will never thrive in compacted ~~fill~~ soils *or sterile soils*, or in conditions not suitable for their optimum growth. Recognition and observance of these realities is critical to successful replacement.

#### E. Steep Slopes

Steep slopes in Pittsfield Township are defined as a naturally occurring landform with a twenty (20) percent *or greater* slope, which shall be considered a vertical change in elevation of ten (10) feet over a horizontal distance of 50-ft.

1. a. Areas of ~~steeper~~ slopes (more than 20%) ~~20% or more~~ shall be protected to reduce erosion potential, maintain slope and stability, control amounts and velocities of surface water runoff, and protect and *maintain* aesthetic resource. ~~In general, slopes greater than 25% should~~ will be excluded from development. ~~Slopes shall be considered in terms of soil types as well as steepness. Special care must be taken~~ where highly erodible soils are present *additional protection may be required*.

b. Development that is permitted on steep slopes shall maintain or enhance the natural contours, vegetation, and drainage patterns to assure the stability of the slope. The existing landform shall be a major factor in the land-use and site-planning processes. The primary objective shall be preservation of natural contours rather than alteration ~~by mass grading~~.

c. Slopes of 40 percent or greater shall be protected as key scenic assets. Where these slopes are visible from locations people frequent off the site, development can have dramatic impact upon the visual character. ~~Such impacts from buildings above the canopy of trees, for example shall be carefully considered~~ or other aesthetic impacts shall be identified and described in the natural features impact statement.

d. ~~A primary goal in protecting steep slopes is to prevent erosion and subsequent damage to natural features on and off the site. The use of retaining walls can reduce the amount of grading necessary, but are on steep slopes is not encouraged. Underground utilities shall not be located in steep slopes and certainly shall not run lengthwise along them. Drainage shall be directed to inlet structures and not be permitted to flow down slopes during and or after construction.~~

#### F. Endangered Species Habitats

1. a. The Michigan Department of Natural Resources (MDNR) regulates the protection of Endangered species and their habitats, in cooperation with the US Fish and Wildlife Service. ~~The Township will work in coordination with state and federal regulating agencies to identify the best protection approach, based on the specific characteristics of the species involved.~~ These species and their habitats shall be excluded from development and protected from the impact of development.

b. For those plant species which are not protected, but are highly desirable and within the road and sidewalk easements of newly approved developments, the petitioner ~~might~~ may consider a cooperative partnership with a volunteer organization and the guidance of the Township whereby transplantation of these species could occur in an orderly fashion.

#### G. Groundwater Recharge

The Pittsfield Charter Township Master Plan has mapped groundwater recharge areas. Using data from the Washtenaw County Soil Survey and from well logs, trained experts can determine areas where water flows quickly through soil, there is a high degree of highly permeable sand and gravel particles in the ground and where the water table is high. In these areas, the risk of groundwater contamination is high. Areas not mapped, but that may also serve as recharge areas, are those with highly permeable geology (sand and/or gravel) or soils, but that do not exhibit a high water table. ~~These higher elevations areas also provide recharge waters to groundwater. The Township may ask for will require investigation and mapping of areas with highly permeable solid and geology to determine their recharge characteristics.~~

##### 1. Protection and Restoration Strategies

a. Development shall be located away from groundwater recharge areas as mapped by the Huron River Watershed Council or otherwise identified. Where development occurs, impervious surfaces shall be limited to the greatest extent possible; Land grading shall be controlled to retain the water holding characteristics of the land; Vegetation essential to the water holding characteristics shall be preserved (or where necessary, enhanced) ~~as part of a development program and the balance and integrity of the hydrological system shall be maintained in a proposed development.~~

c. 3. General-purpose floor drains shall ~~not~~ be allowed ~~only if they are authorized to be connected to a public sewer system, unless they are connected to an onsite holding tank, or a system authorized through a state groundwater discharge permit or are authorized to be connected to public sewage treatment facility capable of treating the hazardous substances used or stored on the site.~~

*Note: We recommend that this document be written to correlate with Ann Arbor's Regulations to the closest extent possible.*