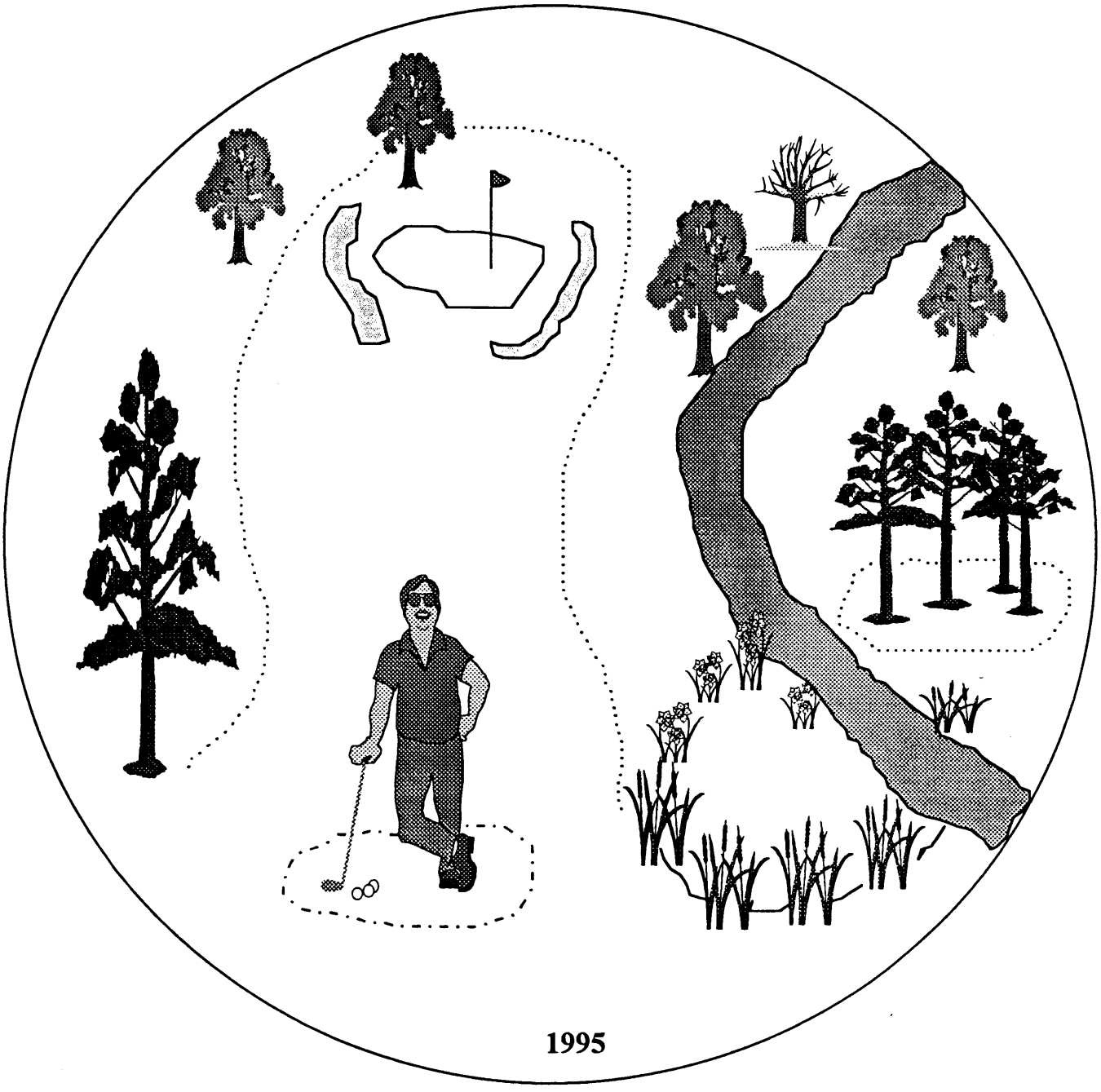
Natural Resource Protection Strategy

for Michigan Golf Courses



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Michigan Department of Natural Resources
Land and Water Management Division and
Surface Water Quality Division

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PRINTED BY AUTHORITY OF Michigan Department of Natural Resources
Total Number of Copies Printed: 2,500 Total Cost: $1,431.60 Cost Per Copy: .58

Michigan Department of Natural Resources DNR

NATURAL RESOURCE PROTECTION STRATEGY FOR MICHIGAN GOLF COURSES

Michigan Department of Natural Resources
Land and Water Management Division
Surface Water Quality Division

INTRODUCTION AND BACKGROUND

Golf is an important industry in Michigan, and is one of the fastest growing sports in America today. The National Golf Foundation estimates that in order to keep up with demand, it will be necessary to add one new course per day through the year 2000. Michigan is the leading state in the number of existing public courses, and has been near the top in new golf course construction during the past several years. It is likely this growth will continue. A direct result of this growth has been a dramatic increase in public concern over the environmental impacts of golf courses. This concern has focused on the perceived impacts of development, operation and maintenance of golf courses to ground and surface water and other natural resources, and the overall quality of life for local communities and their residents.

In an attempt to address these concerns, improve the ability of golf course owners and developers to meet environmental standards, and enhance public understanding, Michigan Department of Natural Resources (MDNR), has developed a number of assistance materials. These materials recognize that, while golf course development and operation has the potential for major environmental impacts, if properly sited, designed and constructed, such development impacts can be eliminated or minimized. Further, proper operation and maintenance of all golf courses can protect not only the quality of ground and surface water, public health and other natural resources, it can actually enhance water resource, open space and recreational values while providing needed economic growth to local communities in Michigan as well as the State as a whole. These publications do not set new standards, but serve to better communicate existing requirements and generally accepted best management practices. The publications include:

> Guidebook of Best Management Practices for Michigan Watersheds: The Guidebook discusses nonpoint sources and impacts, and includes a step-by-step process for developing watershed plans and individual site plans. Its primary purpose is to provide guidance on how to use best management practices (BMPs) within the context of good watershed and site plans. It includes specific, detailed BMPs applicable to design, construction and operation of golf courses.
>
> Natural Resource Protection Strategy for Michigan Golf Courses (this document): It will be available on its own and as an Appendix to the Guidebook.

A one-page Application Cover-sheet, with signature blocks, to be completed by MDNR staff and the applicant during or following the pre-application meeting. It will indicate what supplemental information is required to be submitted with the application. The applicant will file the Cover-sheet with the MDNR application, and Land and Water Management Division's Permit Consolidation Unit will use the Cover-sheet to determine if an application is "administratively complete."

A detailed Checklist (PR 2744), which is designed to assist the golf course developer in planning the project and preparing permit applications. It will also guide MDNR field staff in their permit reviews. It is not required to be turned in to the MDNR. The document consists of bullet statements directly reflecting the items discussed in detail within the Strategy, which the parties can use to double check that all items are appropriately addressed.

Land and Water Management Division also will prepare operating procedures and staff guidance memoranda for inclusion in its Division Guidance/Operating Procedures Manual.

These documents were developed with several uses in mind for those concerned with the proper location, design, construction, operation and maintenance of golf courses in Michigan. They aim to provide potential golf course developers with an easy-to-use list of items that MDNR staff look for in the permit application review process. They also strive to provide greater consistency in the permit application review process by MDNR staff and local units of government. And, they include management practices which should be used by golf course superintendents on both proposed and existing golf courses. Also, agencies and organizations which can provide assistance in the development of these plans are included at the end of the document.

It is in this spirit of voluntary compliance, and cooperative protection of our natural resources, that the Michigan Department of Natural Resources has developed these materials.

SITING AND GENERAL PLANNING CONSIDERATIONS

General Concepts - The most basic principle is to take advantage of what nature has already provided. By emphasizing the existing characteristics of the land and water resources, you can reduce the costs of development, retain the natural beauty of the area and minimize permit requirements. In that regard, examine your proposed development to ensure that:

1. development will follow the natural contours of the land as much as possible;
2. wetland and stream crossings are minimized;
3. any disturbance to wetlands has been avoided to the greatest extent possible;
4. land clearing along rivers, streams, ponds and wetlands is minimized;
5. natural buffers of vegetation have been left adjacent to ponds, streams and wetlands;

6. valuable trees will be preserved;
7. all regulated wetlands have been delineated;
8. the assessment of feasible and prudent alternatives to the use or alteration of wetlands and surface waters confirms that the proposal is justified;
9. endangered species habitat has been identified and the site plan will preserve this habitat; efforts were made to protect habitat for other desirable wildlife (see Audubon reference in "Available Assistance" section of this document);
10. the source of water to be used for irrigation has been identified, and construction and course operations will minimize impacts on the hydrologic condition of the surface and groundwaters so that existing uses of that water are not affected;
11. the pre-development hydrologic regime will be maintained as closely as possible;
12. there are adequate areas to accommodate long-term goals and future expansion;
13. pesticide storage/mixing-loading sites offer adequate well-head protection, either in the form of distance form the mix site or appropriate berming to safeguard the well; and
14. consideration has been given to placing a conservation easement on the undeveloped portion of the tract to ensure protection to natural resource values.

Site Plans - In general, development of golf courses should be similar to any other type of construction project. As described in the Guidebook of Best Management Practices for Michigan's Watersheds, a good site plan for any construction activity includes plan elements of: 1) soil erosion and sedimentation control, (as required under Act 347, the Michigan Soil Erosion and Sedimentation Control Act); 2) grading; and 3) stormwater management.

EARLY CONSULTATION

We cannot overemphasize the importance of discussing your initial thoughts, ideas and conceptual plans at the earliest possible date with the governmental decision makers and technical experts that will be helping you and dealing with your project from start to finish. You will need permits or other approvals from some of them, and others you may find to be of invaluable assistance as your project progresses. Discussing your ideas with these people BEFORE developing any actual plans can save you significant amounts of time and money. You should confer with the following:

Local Government - includes the city, township and county officials in at least the following areas:

1. planning and zoning;
2. public health;
3. county drain commissioner;

4. parks and recreation; and
5. public works, streets, roads and highways.

Local MDNR Office - includes staff of many divisions which may have an interest in your project. You should contact:

6. the District Supervisor of either the Land and Water Management or Surface Water Quality divisions, who will advise other appropriate field staff, and arrange for the Department's participation in the pre-application meeting discussed below. A map and phone numbers of MDNR district offices is included on pages 22 and 23.

Resource Specialists - include other governmental agencies, watershed councils, private consultants and citizens organizations.

7. You should discuss your concepts with the appropriate resource specialists, listed in the "Available Assistance" section of this document, pages 17 and 18.

PRE-APPLICATION, ON-SITE MEETING

A pre-application meeting on-site involving local MDNR staff and all other interested parties (e.g. consultants, local government officials, etc.) will reduce the amount of time required in the permit application and approval process. The following are guidelines for that meeting:

Stake Out the Site Before the Meeting - It is important to have the proposed course laid out so that all can visualize the design and the proximity to surface water, and other natural resources:

1. stake centerline and toe of fill slopes for fairways, greens, driving ranges, tees and hazards in proximity to streams, ponds, lakes, wetlands, floodplains and other surface water resources;
2. stake all proposed excavations and fills, including ponds;
3. stake centerlines of proposed stream crossings; and
4. identify and stake wetlands boundaries in proximity to proposed construction areas and maintained facilities such as parking areas and roads, buildings, service area, etc;
5. identify and stake buffer areas; and
6. provide draft site plan which shows proposed course layout, related facilities and buildings in proximity to all surface water resources, including wetlands.

Meeting and Follow-Up Discussions - During these sessions, directly affected parties are able to mutually inspect the site and discuss the proposal, which should result in the following:

7. identification of issues, and discussion of concerns and alternatives to be further explored and evaluated;
8. completion of the one-page Application Cover-sheet, which confirms the following:
   i. MDNR and other agencies have indicated which permits are required for various development alternatives; and
   ii. MDNR has indicated which of the information discussed below (or additional information) MUST be submitted with the application.

MDNR PERMITS AND APPROVALS - REQUIRED SUBMITTALS

Early consultation, pre-application on-site meeting(s) and other local discussions should have identified and resolved the major issues which may either "make or break" the project. Upon resolution of such major issues, a detailed plan and proposal can be prepared and submitted for processing, review and consideration and possible approval under various local, state and federal statutes.

MDNR Permits Required - All activities which affect wetlands, streams or other water bodies will require a Land and Water Management Division construction permit. All development which exceeds five (5) acres also requires a Stormwater Permit by Rule from MDNR, Surface Water Quality Division. If there are unique resource areas involved, such as designated Natural Rivers or Great Lakes Environmental Areas, sand dunes, endangered or threatened species habitat, etc., there may be additional approvals required. MDNR staff and resource consultants can assist in identification of such areas.

Applications - The Land and Water Management Division's Permit Consolidation Unit (517-373-9244) will coordinate the Department review of permit applications for the majority of these activities. However, the Stormwater "Permit by Rule" coverage must come from the Surface Water Quality Division.

The best way to reduce delays in the MDNR regulatory process is to ensure that all items in this Strategy are followed. It is also critical that all portions of the MDNR application are filled out and addressed. **NOTE: Most applications are returned because the applicant failed to fill out all portions of the permit application or submit the requested information.** In addition to all information specifically requested in the application form and the information on the checklist, an application for a golf course construction or expansion permit may require an environmental assessment, along with construction plans and specifications.

Submittals Required With All Applications -

Complete application - You need to ensure that:
1. the application forms are completely filled out;
2. all information requested by the application has been provided;
3. application was filed with MDNR, Land and Water Management Division;

4. the Stormwater Permit-by-Rule was filed with MDNR Surface Water Quality Division; and
5. all local governmental applications have been filed.

Site plans - In general, development of golf courses should be similar to any other type of construction project. As stated in the Guidebook, a good site plan for any construction activity includes plan elements of: 1) soil erosion and sedimentation control, (as required under Act 347, the Michigan Soil Erosion and Sedimentation Control Act); 2) grading; and 3) stormwater management. The site plan needs to contain the following:

6. Site map, consisting of a topographic map, with a two-foot contour interval, showing:
   a. all surface water resources, wetland boundaries and the type and function of all affected wetland areas;
   b. location of pesticide/fertilizer storage and mix/load sites in relation to water resources;
   c. stationed centerlines and toe of fill slopes for fairways, greens, driving ranges and tees which correspond to the actual staked areas on-site;
   d. location of all existing and proposed buildings, drain tiles, sewers, stream crossings, and other permanent structures and their proximity to surface waters, including wetlands;
   e. existing contours, direction of drainage and proposed grade changes, with cut and fill areas depicted in both plan and cross section view; where possible, water from heavily treated areas like tees and greens is directed away from water resources;
   f. location of all facilities, structures, treatments and measures used for soil erosion and sedimentation control, grading practices and long-term stormwater management; and
   g. location of significant stands of existing trees and shrubs, and proposed buffer areas.

7. A written portion of the site plan which includes:
   a. a justification for use or alteration of surface water resources, including an analysis of feasible and prudent alternatives to use of wetlands;
   b. description and specifications of the soil erosion and sedimentation control mechanisms to be employed during construction;
   c. maintenance schedule for all soil erosion and sedimentation control practices;
   d. explanation of how dewatering will be done such that water is filtered or discharged into a properly designed sediment basin;
   e. description of the construction sequence - how the project will be developed in stages so that small areas are developed and stabilized one at a time, as opposed to developing the entire site at one time;
   f. measures to be used to control dust;

g. description of how the "treatment train" concept, as discussed in the Guidebook, will be used;
h. a description of the stormwater component of the plan; and
i. proposed cutting schemes of vegetation within buffer areas.

8. For ponds, basins and other water storage structures, you must provide:
   a. assurance that water will be released at a controlled rate to a stabilized outlet;
   b. assurance that water treated with chemicals which produce an un-natural color is not released to surface waters
   c. elevation before and after development, along with contours and maximum depths;
   d. that there has been consideration to creating irregular shaped sides and varying bottom contours for wildlife habitat;
   e. design criteria, including storm design, location of the emergency spillway, etc;
   f. assurance that such structures are designed so that they fit into the natural setting; and
   g. the person responsible for the long-term maintenance of the structure has been identified (For golf courses this will usually be the golf course owner).

Submittals Required as a Result of Pre-Application Discussions -

9. **Turf Management Plan.** This should contain the types and amounts of fertilizers and pesticides that will be used for each of the turf grasses and ornamentals chosen for the site. Fertilizer and pesticide use should be coordinated such that irrigation is done at times which will neither carry nutrients or pesticides off the ground and into surface waters, nor result in leaching to groundwater. Information on fertilizers, including storage, handling, mixing, disposing and various types of fertilizers, is included in the Fertilizer Management BMP. Information on pesticides, including storage, handling, mixing, disposing and integrated pest management principles, is included in the Pesticide Management BMP.
   a. Turf selection
      1. the first principle of integrated pest management, identifying disease-resistant species, has been followed;
      2. turf species selection takes into consideration the intended use and location, and its tolerance to shade;
      3. trees, shrubs and ground covers selected are the most disease-resistant species to the site conditions; and
      4. for areas that need to be kept short (tees and greens), grasses selected are those with lower preferred cutting heights - cutting grasses lower than their preferred height reduces the root system and otherwise makes the plants more susceptible to disease.

b. Fertilizers - See the Fertilizer Management BMP for details - the plan should include:
   1. results of soil tests;
   2. type, amount and frequency of fertilizer applications to greens, tees and fairways;
   3. notation of circumstances where nutrients will be applied in excess of soil test recommendations, along with sound justification;
   4. method of application and calibration schedule;
   5. notation of areas other than greens, tees and fairways where fertilizers will be applied - application of fertilizers directly in or adjacent to streams, rivers, lakes or wetlands should be avoided;
   6. location of fertilizer storage, mixing and loading - pesticides, fertilizers and hazardous materials must be stored at least 200 feet from surface water resources, and in separate areas or buildings so that they cannot be confused with one another;
   7. mixing areas are on impervious surfaces;
   8. liquid fertilizers are provided with secondary containment;
   9. a plan to address potential fertilizer spills; and
   10. fertilizers will be disposed of in a manner consistent with the label.

c. Basic Integrated Pest Management principles - As discussed in the BMP Pesticide Management for Turfgrass and Ornamentals, IPM is a pest management system that uses all suitable techniques in a total management system to prevent pests from reaching unacceptable levels, or to reduce existing pest populations. The Pesticide Management BMP includes the basics of integrated pest management, and discusses the concept of degree days to determine pest activity and to ensure management practices are implemented when action thresholds are reached. The turf management plan includes:
   1. an integrated pest management (IPM) that will be used to control the most common types of pests - this includes the use of pest scouting techniques, biological controls, baits, traps and other non-chemical pest control methods before pesticides are considered;
   2. identification of the action threshold for each pest, and the pesticides that will be used if biological or other non-chemical methods are not successful;
   3. pests will be spot treated, wherever possible;
   4. buffer/filter strips will be treated with pesticides only when it is documented that all other non-chemical controls prove to be ineffective. The plan must identify the circumstances in which pesticides will be used in the natural or created buffer areas;
   5. pest populations will be monitored by scouting, baits and traps or other collection methods;

6. pesticide storage areas, separate from fertilizer storage, are indicated;
7. the applicant has identified where pesticides will be mixed, loaded and rinsed. All such activities will be done on impervious areas. Where possible, the design of such areas has been included;
8. the method of application is as target-specific as possible;
9. routine calibration should be done following the calibration procedures in Appendix 4 of the Guidebook;
10. all equipment designed to draw water should have a properly functioning anti-siphoning device;
11. all pesticides are provided with secondary containment;
12. the conditions in which the public will be notified of pesticide applications is included; and
13. restricted use pesticides will only be applied by certified/registered applicators.

d. Irrigation principles include the following:
1. irrigation needs were determined and are consistent with the hydrologic information;
2. an irrigation schedule has been determined, based upon actual rainfall, plant needs, and soil water holding capacity;
3. description of how irrigation will be monitored to ensure that the irrigation schedule was coordinated with the fertilizer management plan above;
4. The design of an irrigation system should take into consideration the potential fate of the irrigated water. Where possible, irrigated water will be recycled by directing runoff to the ponds used as the water source. This would also recycle nutrients or chemicals which were not absorbed by the plants. Irrigated water could also be directed to infiltration practices if pollutant levels are such that groundwater won't be impacted. Direct discharges of runoff to surface waters is the least preferred fate of irrigated water; and
5. back-flow prevention devices (anti-siphon valves) should be installed to prevent back-flow of fertilizers into wells.

e. Mowing:
1. mowing will be done at the preferred height of the grasses selected;
2. if grass clippings and leaves are removed from the greens, tees or fairways, they will be mulched or composted and disposed of in a manner which will not affect surface waters or wetlands; and
3. compost piles are not located in or immediately next to surface waters, wetlands or flood plains, nor on steep slopes or in areas with high water tables.

10. **Water Quality Monitoring Plan.** Certain sites contain high quality surface waters that are particularly susceptible to pollutant sources which may come from golf course construction, operations and maintenance. Typically, citizens and local governmental units are concerned with these possible impacts. All parties can protect themselves, as well as the water resources involved, by establishing baseline water quality before course construction, and monitoring that water quality over a period of time. If problems are encountered, they can be corrected immediately. If no problems are encountered through the monitoring, that information can also be invaluable. The plan needs to be developed such that:

    a. the goals and objectives of the monitoring plan are clearly explained. In many cases, the goals and objectives may include determining trends in water quality over a given period of time to evaluate the effectiveness of the implemented best management practices;

    b. it is clear how the data will be used. There's no sense collecting data if the manager doesn't know what he/she is going to do with it;

    c. baseline survey data is collected, so that comparisons can be drawn between existing and future conditions. Data collected at a later date, using the same methodology, can then be compared to this baseline data. Baseline surveys can include:

        1. physical characteristics including: the lengths, widths, depth and cross sections of the stream; bottom substrate (type and percentage); and habitat. Record observed characteristics and any physical characteristics and take photographs, where possible;

        2. chemical properties, including water sampling. Parameters of interest may include pH, temperature, and total suspended solids (especially during the development of new golf courses), and phosphorus, nitrates and pesticides, before and after development and throughout the life of the course;

        3. biological communities, including fish, invertebrates, plants and mammals. Standard procedures for macro-invertebrate surveys are available from the MDNR, Surface Water Quality Division; and

        4. hydrologic information, including volume and rate of flow. This will help designers to select properly sized culverts and similar structures, and design practices which will limit hydrologic inputs to within the pre-development hydrologic regime, and to determine changes in hydrology over the life of the golf course. Note that hydrologic information was discussed as part of the basic site planning process.

For most plans, this data will likely be collected both upstream and downstream of the proposed development. Sampling should be done

at least monthly, as well as some done during dry weather and some done during storm events (all storm events should be recorded). There should be a minimum of three of each type of sample (seven is ideal). Work with consultants or MDNR staff to identify the best upstream and downstream locations and to determine site-specific parameters. Private consultants can also conduct the actual monitoring. Further:

d. the appropriate parameters have been identified and they correspond with the goals and objectives. If, for example, the goals of the plan are to evaluate the effectiveness of the fertilizer management program, then the parameters should include nutrients;

e. locations where samples will be taken are included, either on a map or in written form;

f. the method and frequency of sample collection has been determined. This should include how the samples will be taken and the numbers of samples which will be collected per each location. This information should be as specific as possible. Data should be collected using standardized collection procedures. Proper procedures will vary depending on the type of data collected;

g. the laboratory that will be used for analysis and the method of analysis have been submitted. The applicant should be using analytical laboratories with approved quality assurance/quality control plans. There should be some indication that the lab will be using standard methods of analysis;

h. sample results will be analyzed by professionals familiar with sampling methodology, chemical parameters, and DNR specified detection levels for all parameters analyzed. The applicant will use reputable consultants or MDNR staff (when available) to help analyze the results; and

i. the analyzed data will be used to determine a plan of action when problems are indicated. If problems are indicated, the management practices being used on the golf course will be re-evaluated. For example, if nitrate concentrations are elevated, the applicant will modify the turf management plan after reviewing the checklist above and the specifications of the Pesticide Management and Fertilizer Management BMP's.

11. **Soil Management Plan.** Soil management is managing soil to provide the best growing conditions for turf and other vegetation. It may include adding lime, fertilizer or other constituents to the existing soil to address fertility problems, abnormal moisture content or inappropriate pH. It also includes cultivation and drainage techniques. The soil management plan should include:

a. the results of on-site soil samples, showing all the soil textures on the site. Soil textures will help determine the BMPs necessary to meet the goals of the site plan. Soil textures

should be determined for the maximum depth in which a structure is proposed;

b. soil sampling results for nutrient and organic content. Soil tests for nutrient management purposes should be collected from the top three inches of soil. Enough samples should be taken and the samples mixed together, in order to get a representative sample from the course;

c. soil samples for turf areas that differ significantly in grass type, use or growing conditions are analyzed separately;

d. soil analyses for pH;

e. statement that soil test results were used to determine the amount of nutrients to be applied; and

f. statement that soil samples will be collected and analyzed every three years for nutrients, organic content and pH so lime, fertilizers and other soil amendments will be applied correctly.

12. **Woody Vegetation Management Plan.** Protection of existing trees and shrubs and select planting of new woody vegetation can greatly enhance the aesthetics of a golf course, while providing for infiltration of surface water runoff, erosion control, and absorption of nutrients, chemicals and other pollutants. A woody buffer strip along water bodies can also shade the water body, thereby reducing thermal pollution, and make an important contribution to the aquatic food chain. The plan needs to be such that:

a. it will protect and maintain the existing woody vegetation as natural buffers, to the extent possible;

b. woody vegetation will be maintained by regular monitoring of the health of the vegetation, by disease and pest management using the IPM plan, and by limited pruning and cutting when absolutely necessary;

c. all pruned branches will be disposed of following the Organic Debris Disposal BMP; and

d. woody vegetation is protected from root damage caused by heavy equipment during construction and by fill (fill should not be placed within the drip line).

13. **Equipment Maintenance and Storage Area Plan.** The Equipment Maintenance and Storage Area BMP includes the types of practices which should be followed for equipment maintenance and storage, both during construction and for the ongoing maintenance of existing courses. Note that the storage, handling and disposal of hazardous wastes are carefully regulated by the MDNR, Waste Management Division (WMD) and applicants are encouraged to contact WMD for specific requirements. The equipment maintenance and storage area plan should ensure that:

a. wastes such as empty hydraulic fluids canisters and other non-hazardous waste and litter are disposed of in trash cans, dumpsters or other appropriate receptacles - receptacles are properly maintained;

b. vehicles and equipment are stored and maintained on sealed, impervious areas;
c. floor drains are designed to drain to sanitary sewers. If floor drains drain to storm sewers, the drains have been plugged;
d. the golf course manager is familiar with the location of all underground storage tanks, septic fields and any other underground structures;
e. materials are on hand for the containment and cleanup of spills;
f. secondary containment is provided for all hazardous materials;
g. hazardous materials are stored in sealed, locked areas or buildings and are such that they cannot be confused with one another. All materials are registered with the fire marshal. Storage locations for these materials are located on the site plan. Posting of these areas is required; and
h. Material Safety Data Sheets (MSDSs) are available for all hazardous materials.

14. **Spill Response Plan.** This plan includes the steps to be followed in case chemical materials are spilled. The remainder of the information below primarily deals with spills of gas and motor oil. If other materials are used, a response similar to that outlined below MAY be appropriate, but because other materials may have specific hazards all potential hazards should be identified, safe handling measures developed, and appropriate spill response procedures added to this plan. The spill response plan includes at a minimum the following:
a. Clearly identify the appropriate responding authorities. They may be the MDNR district office, state police or local emergency response. If no other phone number is available, the Pollution Emergency Alerting System (PEAS), 1-800-292-4706, can be used. This number is in use 24 hours a day;
b. in the event of a spill of gasoline, fuel oil or motor oil, follow the steps below:
    1. Insure the safety of yourself and anyone else on site. In areas where you can smell spilled material, do not smoke or use open flame or devices which produce a spark (such as internal combustion engines). Evacuate any area where the danger of explosion is high. Tend to any injuries;
    2. Contain the spill. Build dikes or pits or use absorbent pads to keep the spill from spreading until it can be retrieved. If the spill is in water, contact the appropriate authority (see above) and either use absorbent booms, logs or earth dams. Keep in mind that containing spilled material on porous soils may contaminate underlying groundwater. On porous soils, either consider another way to contain the spill or retrieve the spilled material as soon as possible;
    3. Retrieve the spilled material. Collect and dispose of the material at an approved disposal sight as soon as

possible. If you do not have the necessary equipment or the amount of spilled material is very large a contractor should be called to perform the cleanup. A list of potential spill response firms is attached at the end of this document. Phone numbers for other local spill response firms or a company response team should be added to this spill response plan for easy access; and

4. If material is lost to the ground or a surface water the appropriate authority must be contacted immediately. For smaller spills easily contained and cleaned up, authorities will be contacted after all cleanup activities are completed;

c. the job site and vehicles used to transport materials contain equipment needed to deal with a spill;

d. the plan has been made available and reviewed by everyone who will handle this material, as well as persons hauling materials and wastes into and out of the golf course; and

e. a written pesticide spill response/cleanup plan for the golf course--based on the turf management plan--is a component of this plan.

15. **Waste Management Plan.** This item needs to ensure that:

a. on-site sewage treatment systems include a clean-out schedule, monitoring plan, reporting plan and schedule for replacement and/or upgrading, in accordance with local county health department regulations and requirements; and

b. after construction, trash collection, storage and removal will continue to be addressed. Ideally, a recycling program should be established. (Note: waste management during construction was discussed under the Equipment Maintenance and Storage Areas Plan).

PROCESSING AND EVALUATION OF APPLICATIONS, AND PERMIT ISSUANCE

1. **Land and Water Management Division Permit**

a. Land and Water Management Division construction permit applications, along with the appropriate fee, and the Application Cover Sheet and required submittals, must be filed with the Division's Permit Consolidation Unit (PCU) in Lansing. PCU will: log in the application; deposit the fee with the State Treasurer's office; determine the exact laws under which the project falls; conduct a computer search to determine if there are special natural resource values associated with the site; and review the application to determine if it is "administratively complete". "Administratively complete" means that all of the following has been submitted: all information on the application form; the proper fee; and all other information noted during the pre-application discussions. In making this determination, PCU staff will use the Application Cover Sheet (PR 2743) and the

Checklist (PR 2744), in conjunction with the application submitted by L&WMD (PR 2731). Once the application is determined to be administratively complete, the entire file is assigned to a L&WMD field person. NOTE: In Michigan, the Land and Water Management Division administers Section 404 of the Federal Clean Water Act, for fills within "waters of the United States". Except in very limited cases along the Great Lakes shoreline and on federally navigable rivers, no separate federal filing is necessary.

b. Public Notice Requirements - An application for a new golf course, expansion of an existing course, and many other activities associated with a golf course, will normally require a "public notice" to be issued. This means that local governmental units, nearby landowners, and other citizens are notified of the application, and given an opportunity to comment on it. They have the right to ask that a public hearing be held to discuss the merits of the proposal. If a hearing is held, the applicant will be given an opportunity to explain the proposal and answer questions. Conduct of a public hearing increases the processing time for permits.

c. MDNR Field Review - Normally, the MDNR staff person assigned the file is the one that conducted the pre-application, on-site meeting. They should be very familiar with the proposal and the issues. It is now their job to evaluate the proposal in light of the criteria in the applicable laws, and all of the comments offered by the adjacent landowners, local governmental units, state and federal resource agency officials and other citizens. They must attempt to balance the desires of the applicant with the concerns of the public and the environmental constraints of the site. Hopefully, this Strategy and its associated documents have been used during the planning phase, and been found useful. If so, resource impacts should be minimal, and a permit can be issued in a short time period. If problems do exist, the L&WMD staff person must resolve those before a permit can be issued. While the specific criteria varies from law to law, generally the Department will issue a permit if it finds that the structure or project will not adversely affect the public trust or riparian rights, and that no other feasible alternative exists which would lessen the impact to surface water and wetland resources. A permit will not be issued if the proposed project or structure will unlawfully impair or destroy any of the waters or other natural resources of the state.

d. Permit Conditions and Responsibility of Permittee - In issuing the permit, staff may include such conditions as are necessary to ensure protection of the waters of the state and other natural resources. It shall specify that the project will not cause unlawful pollution. The applicant, both during construction, and in the operations and maintenance of the facility, has the responsibility to meet the conditions of the permit, and

otherwise ensure against unlawful pollution to the waters or other natural resources of the state.

2. **Surface Water Quality Division (SWQD) Stormwater Permit by Rule**

   a. Construction activities which disturb 5 or more acres must be covered by a National Pollution Discharge Elimination System (NPDES) stormwater permit. SWQD provides NPDES coverage under a Permit by Rule. The applicant must first obtain an Act 347 Soil Erosion and Sedimentation permit from the appropriate local enforcing agent. The applicant then completes a "Notice of Coverage" (NOC) form, and submits that, along with the appropriate fee, to the SWQD Permits Section. If the Act 347 permit is valid, Permit by Rule coverage is granted immediately upon receipt of a complete NOC. The permittee should understand the following: 1) that approval by an Act 347 agency of an inadequate soil erosion plan does not release the permittee from liability under the Stormwater Permit by Rule; 2) violation of any condition of the Act 347 permit also constitutes a violation under the Stormwater Permit by Rule; 3) coverage is valid only if the Act 347 Permit remains valid; and 4) Permit by Rule coverage also requires that a certified stormwater operator perform weekly inspections of soil erosion control measures being used at the site, and maintain a log of those inspections.

AVAILABLE ASSISTANCE

The **National Golf Foundation** will provide information on the feasibility, costs, equipment needs and facilities required in the development of a golf course. A representative will visit the site on request. The following publications are available from the National Golf Foundation at 1150 South US Highway One, Jupiter, FL, or call: 1-800-733-6006, FAX 407-744-9085.

- Planning and Building the Golf Course
- Planning Information for Private Golf Courses
- Organizing and Operating Public Golf Courses
- The Professional Golf Shop
- Planning the Golf Clubhouse
- information sheets on design, construction and operation
- listing of golf course architects

Universities:
Michigan State University (MSU). Local county offices of the MSU Extension can get you information and put you in touch with resource experts at Michigan State University. The primary resource contact at Michigan State is the Department of Crop and Soil Science. They can provide information on soils, fertilizers and turfgrass establishment and maintenance under Michigan conditions. They offer the following publications:

- Lawn Establishment (Extension Bulletin E-673)
- Lawn Care (Extension Bulletin E-646)
- Lawn Weed Control (Extension Bulletin E-653)
- Turfgrass Varieties and Seeding Rates (# 1353)
- Bentgrass Varieties (# 1352.2)
- Planting Bentgrass Greens (# 1352)
- Management of Bentgrass Putting Greens (# 1354)
- Selecting the Level of Turfgrass Maintenance (# 1351)

The Water Resources Institute at Grand Valley State University has experience in the design, construction, maintenance and monitoring of golf courses built to minimize environmental impacts. The following services are available through the Institute:

- Wetland and stream enhancement practices that reduce excess nutrient and sediment loading;
- Pesticide and metals analysis of soils, sediments and surface waters;
- Nutrient budgets for turfgrass maintenance;
- Best Management Practices for nutrient and sediment control during golf course construction;
- Biological assessment and monitoring of wetlands associated with golf courses;
- Environmental compliance assistance; and
- Database management.

For information, contact the Water Resources Institute at Grand Valley State University, One Campus Drive, Allendale, Michigan 49401, or call: 616-895-3271.

Ferris State University in Big Rapids offers a Bachelor of Science program in Professional Golf Management. Staff of that Department can assist in placement of general managers and PGA professionals, as well as assistant professionals and student interns. For information, contact: Professional Golf Management, Ferris State University, 1506 Knollview Drive, Big Rapids, Michigan 49307-2290, or call: 616-592-2839.

United States Department of Agriculture, Natural Resources Conservation Service, along with the local Soil and Water Conservation Districts, can provide soil survey information, limited soil testing and expertise in best management practices - located in most county seats.

Department of Natural Resources District Offices - map and phone numbers attached

Surface Water Quality Division
Land and Water Management Division
Fisheries Division
Wildlife Division
Forest Management Division
Lansing Permit Consolidation Unit (517) 373-9244

Local river **watershed councils** (list attached) and **County Drain Commissioners** both can provide assistance on water resources and management activities within the watershed and the county where your golf course is planned.

The **Audubon Cooperative Sanctuary Program (ACSP) for Golf Courses.** This program was designed to enhance wildlife habitat on existing and future golf courses, encourage active participation in conservation programs by the golf industry, recognize golf course as an important open space, and educate the public on the benefits of golf courses. It also aims to increase awareness about positive golf course contributions to the environment. The program is sponsored by the Audubon Society of New York State, Inc. and the U.S. Golf Association. For further information call or write:

Audubon Society of New York State, Inc. USGA
Hollyhock Hollow Sanctuary Golf House
Route 2, Box 131 P.O. Box 708
Selkirk, NY 12158 Far Hills, NJ 07931-0708
(518) 767-9051(908) 234-2300

Private environmental and permitting consultants can assist you in understanding environmental regulations, delineating wetlands, completing necessary studies and applying for required permits.

Golf Associations:

American Society of Golf Course Architects
221 N. LaSalle Street
Chicago, Illinois 60601
312-372-7090

Golf Association of America
31800 Northwestern Highway,
Suite 130
Farmington Hills, Michigan 48018
313-855-4653

Golf Course Builders of America
920 Airport Road, Suite 210
Chapel Hill, NC 27514
919-942-8922

Golf Course Superintendents Association of America
1617 St. Andrews Drive
Lawrence, Kansas 66049
800-472-7878

Michiana Irrigation Association
4109 S. Pine Dell Drive
Lansing, Michigan 48911

Michigan Border Cities Golf Course Superintendents Association
23640 E. Lobost
Novi, Michigan

Michigan Turfgrass Foundation
P.O. Box 80071
Lansing, Michigan 48908

Mid-Michigan Turf Association
1103 Eastman
Midland, Michigan 48640

National Golf Course Owners Association
14 Exchange St., P.O. Box 1061
Charleston, SC
803-577-5239

National Golf Foundation
1150 South U.S. Highway One
Jupiter, Florida 33477
407-744-6006

Northern Michigan Turf Managers Association
3733 Apollo Drive
Traverse City, Michigan 49684
616-943-8343

United States Golf Association
Golf Journal P.O. Box 708
Far Hills, New Jersey 07931
201-234-2300

Western Michigan Golf Course Superintendents Association
15784 Pruin
Spring Lake, Michigan 49456
616-842-4840

REFERENCES

Balogh, James C. and William J. Walker, editors, 1992, Golf Course Management and Construction: Environmental Issues, Lewis Publishers.

Golf Course Development in Hawaii: Impacts and Policy Recommendations, 1992, Hawaii Office of State Planning, Honolulu, Hawaii.

Golf Course Management, published monthly by the Golf Course Superintendents Association of America, Lawrence, Kansas.

Impacts of Golf Courses on Groundwater and Surface Water in Michigan, by the Regional Groundwater Center at the University of Michigan Biological Station.

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1988 Michigan Turfgrass Industry Report - Detail Report for Golf Courses, 1988, Michigan Turfgrass Foundation, Lansing, Michigan.

Klein, Richard D, 1990, Protecting the Aquatic Environment From the Effects of Golf Courses,
Community and Environmental Defense Associates, Maryland Line, Maryland.

Love, William R, 1992, An Environmental Approach to Golf Course Development, the American Society of Golf Course Architects, Chicago, Illinois.

Otsego County Water Quality Committee, 1992, Policy Guidelines for Minimizing Environmental Impacts from Golf Course Development in Otsego County, Northeast Michigan Council of Governments, Gaylord, Michigan.

Petrovic, A. Martin, 1991, "Golf Course Management and Nitrates in Groundwater: the Real Story", Cornell University, Cornell, New York.

60th. Annual Michigan Turfgrass Conference Proceedings, 1990, Michigan Turfgrass Foundation, Lansing, Michigan.

Turfgrass Pest Management: a Training Manual for Commercial Pesticide Applicators, 1992, Extension Bulletin E-2327, Michigan State University Cooperative Extension Service, East Lansing, Michigan.

Watschke, Thomas L., Scott Harrison and G.W. Hamilton, 1989, "Does Fertilizer/Pesticide Use on a Golf Course Put Water Resources in Peril?", Pennsylvania State University, University Park, Pennsylvania.

MICHIGAN SPILL RESPONSE FIRMS

The following are listed according to their location. However, most will travel to wherever needed.

BARK RIVER
Stenberg Brothers, Inc.
P.O. Box 127
Bark River, MI 49807
906-466-9908

MT. PLEASANT

Moravy Trucking Company
1934 Commercial Drive
P.O. Box 530
Mt. Pleasant, MI 48864-0530
517-773-6971

SAGINAW
Bierlein Environmental Services, Inc.
2903 S. Graham Road
Saginaw, MI 48603
517-781-1810

FLINT AREA
Drury Brothers, Inc.
11950 E. Newberry Road
Durand, MI 48429
517-288-2611

Youngs Environmental Cleanup
5305 North Dort Highway
Flint, MI 48505
313-789-7155

SOUTHEAST MICHIGAN
Great Lakes Environmental
22077 Mound Rd.
Warren, MI 48091-1208
313-758-0400

K & D Industrial Services
6470 Beverly Plaza
Romulus, MI 48174
313-729-3350

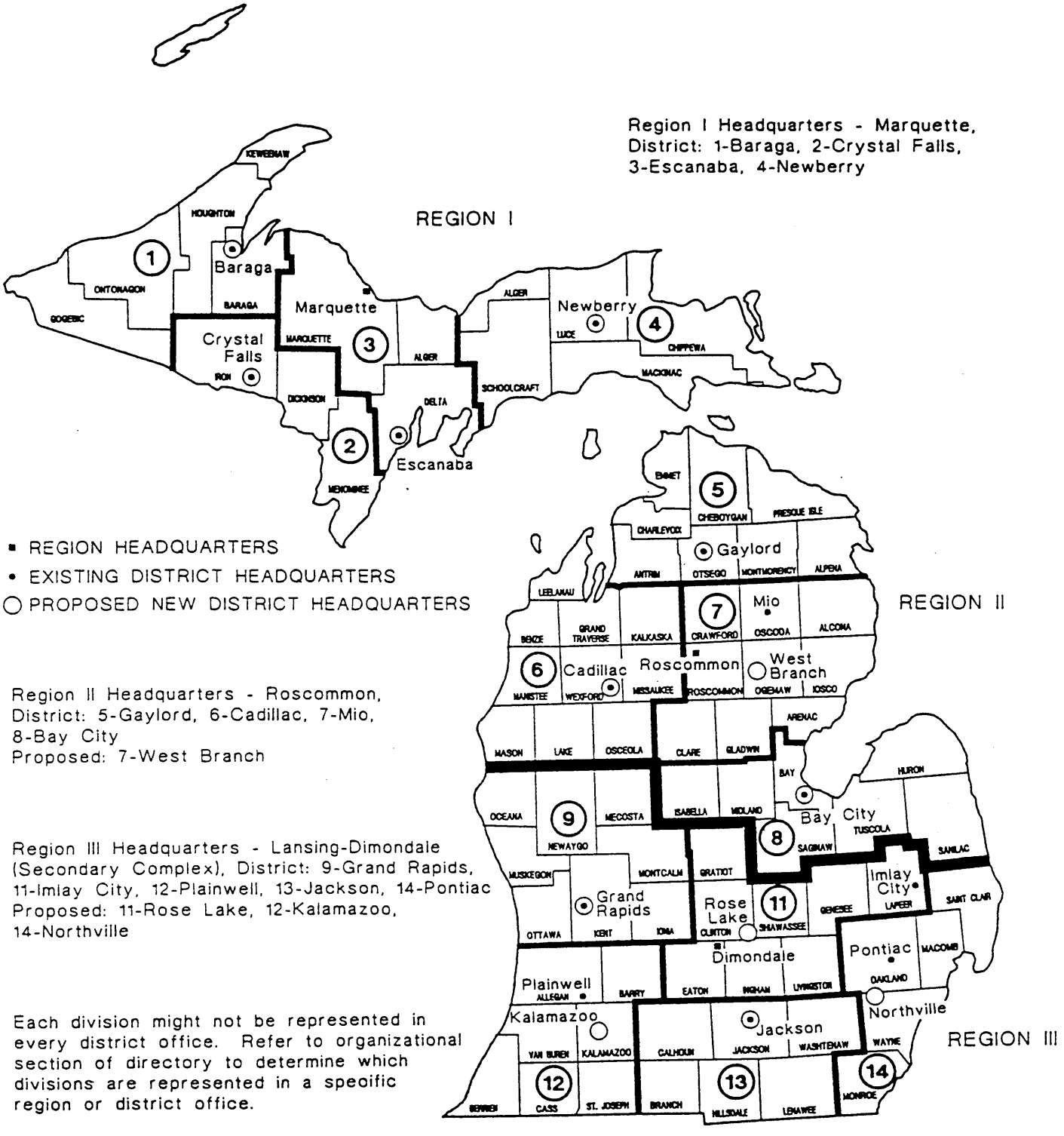
Inland Waters Pollution Control
2021 Schaefer
Detroit, MI 48217
313-841-5800

Marine Pollution Control (MPC)
8631 West Jefferson
Detroit MI 48217
313-849-2332

TRAVERSE CITY
Egeler Industrial Waste, Inc.
9246 Cedar Run Road
Traverse City MI 49684
616-946-6801

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

REGIONS AND DISTRICTS



DISTRICT OFFICES

REGION I

BARAGA
427 US-41 North
Baraga MI 49908
906-353-6651
906-353-7464 FAX

CRYSTAL FALLS
1420 US-2 West
Crystal Falls MI 49920
906-875-6622
906-875-3336 FAX

ESCANABA
6833 Highway 2,41 & M-35
Gladstone MI 49837
906-786-2351
906-786-1300 FAX

ISHPEMING FIELD OFFICE
1985 US-41 West
Ishpeming MI 49849
906-485-1031

MARQUETTE
1990 US-41 South
Marquette MI 49855-9131
906-228-6561
906-228-5245 FAX

NEWBERRY
PO Box 77
RR #1, S-123
Newberry MI 49868
906-293-5131
906-293-8728 FAX

REGION II

BAY CITY
503 North Euclid
Bay City MI 48706
517-684-9141
517-684-4482 FAX

CADILLAC
8015 Mackinaw Trail
Cadillac MI 49601
616-775-9727
616-775-9671 FAX

GAYLORD
PO Box 667
Gaylord MI 49735
517-732-3541
517-732-0794 FAX

MIO
PO Box 939
191 South Mount Tom Road
Mio MI 48647
517-826-3211
517-826-3509 FAX

ROSCOMMON
8717 North Roscommon Rd
PO Box 128
Roscommon MI 48653
517-275-5151
517-275-5167 FAX

REGION III

SECONDARY COMPLEX
PO Box 30028
Lansing MI 48909
517-322-1300
517-322-6311 FAX

GRAND RAPIDS
350 Ottawa Northwest
Grand Rapids MI 49503
616-456-5071
616-456-1239 FAX

JACKSON
301 East Louis Glick Hwy
Jackson MI 49201
517-780-7900
517-780-7855 FAX

LIVONIA
38980 7 Mile
Livonia MI 48152
313-953-0241
313-953-0243 FAX

SHIAWASSEE
10650 South Bennett Drive
Morrice MI 48857
517-625-4600
517-625-5000 FAX

PLAINWELL
PO Box 355
Plainwell MI 49080
616-685-6851
616-685-1362 FAX