



AGENDA
CHARTER TOWNSHIP OF MERIDIAN
ENVIRONMENTAL COMMISSION

October 4, 2017 7:00 pm



1. CALL MEETING TO ORDER AT 7:00 PM
2. GREEN THEMES PRESENTATION- Robert Binder, Public Engagement Project Manager, Sycamore Consulting - **Connecting Meridian Township's Built Environment - Engaging with Transportation and Sustainability**
3. APPROVAL OF THE AGENDA
4. APPROVAL OF THE MINUTES
5. PUBLIC REMARKS
6. NEW BUSINESS
 - A. ACTION: Wetland Use Permit #17-01 (Coyote Creek)
 - B. Strategic Plan 2018 Review and Discussion
7. OLD BUSINESS
 - A. Climate Sustainability Plan Update
8. CHAIR'S REPORT
9. STAFF REPORT
10. COMMISSION/LIASON/WORKGROUP REPORTS
 - A. Planning
 - B. Land Preservation
 - C. Energy
 - D. Parks and Recreation
 - E. Transportation
 - F. Student Report
11. PUBLIC REMARKS
12. ADJOURNMENT

Individuals with disabilities requiring auxiliary aids or services should contact the Meridian Township Board by contacting:
Township Manager Frank L. Walsh, 5151 Marsh Road, Okemos, MI 48864 or 517.853.4258 - Ten Day Notice is Required.
Meeting Location: 5151 Marsh Road, Okemos, Town Hall Room

**CHARTER TOWNSHIP OF MERIDIAN
ENVIRONMENTAL COMMISSION MINUTES
Town Hall Room – Municipal Building
SEPTEMBER 6, 2017 - DRAFT**

REGULAR MEETING

PRESENT: Chair Bill McConnell, Commissioners Ned Jackson, Susan Masten, John Sarver, Jim Kielbaso, Kirk Lapham, Marina Ionescu, and Ben Holland

ABSENT: NONE

STAFF: Assistant Planner Jennifer Quinlivan

OTHERS: Kelsey Dillon

1. CALL REGULAR MEETING TO ORDER

Chair Bill McConnell called the meeting to order at 7:04 p.m.

2. GREEN THEMES PRESENTATION – Kelsey Dillon – “Stewardship in Meridian Township”

Kelsey Dillon from the Township Department of Parks and Recreation presented on the management and public engagement of the Township’s parks, natural areas, and land preservation sites. The Township has over 1,400 acres of parks and land preservation sites. Ms. Dillon reported they utilize public involvement and support to help manage and protect these areas. The goal of the department for the land preservation sites and natural areas is to restore the ecological function and health of the site through active management, creating biodiversity, and removal of noxious plant material.

The Department partnered with Michigan Natural Features Inventory (MNFI) to map and identify over 100 vernal pools within the Township and to establish long term monitoring efforts. Vernal pools are seasonal bodies of water with no fish and are vital breeding grounds for a vast variety of species including the fairy shrimp. The monitoring efforts are done both by the department on public lands and by volunteer citizens on their own properties. The volunteers are given a kit to record data and report back the data to MNFI. Once the department has recorded the vernal pool information it will be linked to the Township website.

Ms. Dillion reported on the Townships largest land preservation site, Towar Woods, which is over 100 acres in size. She reported the Township was actively managing the area and had removed approximately six acres of invasive plants from the site. The department worked with volunteers including 90 students from Murphy Elementary to stake and tube newly planted trees within the Township.

Additional community outreach and land management projects include a prescribed burn at the David Foster Land Preserve (which is on a 10 year grassland management plan), “Love-a-Park” day (involving the cleanup and management of five Township parks and 50 volunteers), and the recent educational “seed ball” event, which involved students creating balls of seed and then launching them into designated areas of a natural area for plant regeneration.

3. APPROVAL OF THE REGULAR MEETING AGENDA

MOTION BY COMMISSIONER KIELBASO TO APPROVE THE AGENDA. SUPPORTED BY COMMISSIONER MASTEN. MOTION APPROVED 8-0.

4. APPROVAL OF MINUTES FROM AUGUST 2, 2017 MEETING

MOTION BY COMMISSIONER MASTEN TO APPROVE THE MINUTES. SUPPORTED BY COMMISSIONER JACKSON. MOTION APPROVED 8-0.

5. PUBLIC REMARKS

NONE

6. NEW BUSINESS

NONE

7. OLD BUSINESS

- A. Climate Sustainability Plan. Chair McConnell reported on the status of the plan, noting the plan would be on a future Township Board Agenda for review and acceptance.
- B. Citizen's Climate Lobby request for a resolution of endorsement of Congressional measures to address climate action. Chair McConnell asked for the Commission to take action on the request. Commissioner Masten expressed concern regarding the type of motion requested as well as the limits of the Commission's role in an action. Commissioner Kielbaso questioned what was involved in the request and Commissioner Sarver clarified the request from the Citizen's Climate Lobby was for a letter of resolution by the Township Board to support measures at the Congressional level addressing climate action. Commissioner Lapham questioned what impact and role the Commission should take on this request. The Commission determined to take no action on the request. Chair McConnell suggested the Citizen's Climate Lobby put the request directly to the Township Board for future consideration and support.

CHAIR'S REPORT

NONE

8. STAFF REPORT

Staff noted the Commission's Strategic Plan for 2017 was up for review and encouraged the Commission to review the 2017 plan, noting areas in the plan which could be partnered with the proposed Climate Sustainability Plan. Staff included the importance of identifying measureable outcomes and benchmarks for the 2018 Strategic Plan, goals and objectives.

Staff reported on the upcoming list of Green Themes Presenters to the Commission.

9. COMMISSIONER SUBCOMMITTEE REPORTS

Planning: NONE

Land Preservation: Commissioner Kielbaso reported the Land Preservation Advisory Board was in the process of reviewing a possible property for land preservation.

Energy Team: NONE

Parks: NONE

Transportation: Commissioner Ionescu reported on Railroad Quiet Zones and Complete Streets.

Student Report: Student Commissioner Holland reported on the solar panel project at the Okemos High School.

10. PUBLIC REMARKS

NONE

11. ADJOURNMENT

Meeting adjourned at 8:48 p.m. without objection.



To: Environmental Commissioners
From: JENNIFER QUINLIVAN
Jennifer Quinlivan, Assistant Planner
Date: September 28, 2017
Re: Wetland Use Permit #17-01 (Coyote Creek)

The applicant, Ingham County Drain Commission has submitted a wetland use permit application requesting the excavation of wetland to create a 40-foot long ditch. The ditch proposed is .01 to .05 deep within the wetland. The ditch is 1.5 feet wide at the bottom and 2.0 feet wide at the top. The total wetland area impacted by the request is approximately 0.001 acre, with the removal of 1.4 cubic yards of soil.

The project and impacted wetland (Wetland No. 33-2) is located in Section 33 of the Township. Wetland No. 33-2 is contiguous with the Smith Consolidated Drain. The project area is located near the Coyote Creek Condominiums, Parcel Number 33-02-02-33-327-100. The focus of the project is to move seasonal flood water across a small high point in the wetland, and to reduce seasonal flooding in the maintained lawn area of the condominiums.

The condominiums parcel is a residential property with maintained lawns and wetlands. The wetland consists of wet meadow, scrub-shrub wetland and a few mature cottonwood trees.

The Township Environmental Consultant has reviewed the application, wetland documentation, and has prepared a report dated September 28, 2017. In the report, the review standards and eleven criteria found in Section 22-157 of the Township Ordinances are used to review the application and wetland documentation. Based on the review of the criteria, the Township consultant found the proposed project meets the Township's requirements for a wetland use permit and recommends the following conditions:

- *Ensure the excavated soil be removed from the wetland and placed in an upland location.*
- *Implement appropriate Soil Erosion and Sedimentation Control measures during construction to ensure there are no impact to wetlands outside of project activities as a result of soil erosion. These measures include installation of straw blanket and cover crop of annual grasses with in the ditch. It is assumed that the ditch will reseed from the surrounding wetland meadow and hand seeding of perennial wetland species will not be necessary.*

The applicant has received approval of minor project permit from the Michigan Department of Environmental Quality (MDEQ) on September 25, 2017 for the proposed project.

MOTION to recommend approval of Wetland Use Permit #17-01 (Coyote Creek) with conditions by the Director of Community Planning and Development.



Attachments

1. Wetland Use Permit application, dated September 22, 2017 and received by the Township on September 26, 2017.
2. Environmental Consultant report, dated September 28, 2017 and received by the Township on September 28, 2017
3. Michigan Department of Environmental Quality (MDEQ), Water Resources Division Minor Project Permit, dated September 25, 2017 and received by the Township on September 28, 2017.

G:\Community Planning & Development\Planning\ENVCOMM\Memos\2017 memos\WUP #17-01 (Coyote Creek)



September 22, 2017

Michigan Department of Environmental Quality
Ms. Carol Valor
P.O. Box 30204
Lansing, MI 48909

RE: Permit Application, Ingham County Drain Commissioner, Coyote Creek
Condominiums; Smith Consolidated Drain

Dear Ms. Valor:

Enclosed please find a complete permit application requesting approvals for minor wetland impacts to alleviate flooding adjacent to Coyote Creek Condominiums. As you are aware from our recent site visit, the proposed work is minor, and will not result in wetland loss in size or function. The intent is to move seasonal flood water across a small high point in the wetland to provide flood relief.

We appreciate your attention to our application. If you have any questions please contact me at 586-764-9366.

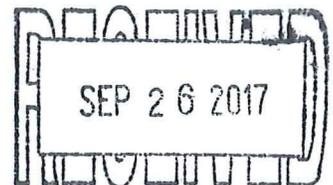
Sincerely,

STREAMSIDE ECOLOGICAL SERVICES, INC.

A handwritten signature in black ink, appearing to read "Michael B. Nurse".

Michael B. Nurse, PWS, Wetlands/Aquatic Biologist

Atts:





AGENCY USE	Previous USACE File Number	Date Received	DEQ File Number
	USACE File Number		Fee received \$

Validate that all parts of this checklist are submitted with the application package. Fill out application and additional pages as needed.

- All items in Sections 1 through 9 are completed.
- Project-specific Sections 10 through 20 are completed.
- Dimensions, volumes, and calculations are provided for all impact areas.
- All information contained in the headings for the appropriate Sections (1-20) are addressed, and identified attachments (➔) are included.
- Map, site plan(s), cross sections; one set must be black and white on 8 1/2 by 11 inch paper; photographs.
- Application fee is attached.

1 Project Location Information For Latitude, Longitude, and TRS info anywhere in Michigan see www.mcqi.state.mi.us/wetlands/

Project Address (road, if no street address) Coyote Creek Dr.	Zip Code 48864	Municipality (Township/Village/City) Meridian	County Ingham
Property Tax Identification Number(s) Na	Latitude 42.68754 N	Township/Range/Section (TRS) T 04N N or S; R 01W E or W; Sec 33 OR Private Claim # _____	
Subdivision/Plat and Lot Number Na	Longitude - 84.43597 W		

2 Applicant and Agent Information

Owner/Applicant (individual or corporate name) Patrick E. Lindemann, Ingham County Drain Commissioner	Agent/Contractor (firm name and contact person) Streamside Ecological Services, Mike Nurse
Mailing Address 707 Buhl, PO Box 220	Mailing Address 3940 Timpson Ave SE
City Mason State MI Zip Code 48854	City Lowell State MI Zip Code 49331
Contact Phone Number 517-676-8395 Fax 517-676-8364	Contact Phone Number (586) 764-9366 Fax Na
Email	E-mail mnurse@streamsideeco
<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Is the applicant the sole owner of all property on which this project is to be constructed and all property involved or impacted by this project? ➔ If no, attach letter(s) of authorization from all property owners including the owner of the disposal site.	
Property Owner's Name (If different from applicant)	Mailing Address
Contact Phone Number (517) 290-2582	City Lansing State MI Zip Code 48911

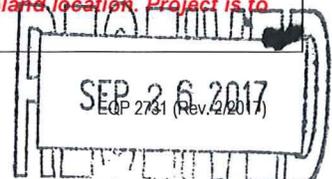
3 Project Description

Project Name Smith Consolidated Drain; Coyote Creek	Preapplication File Number With Carol Valor - - -P
Name of Water body Wetland	Date project staked/flagged September 15, 2017
The proposed project is on, within, or involves (check all that apply)	
<input type="checkbox"/> an inland lake (5 acres or more) <input type="checkbox"/> a pond (less than 5 acres) <input type="checkbox"/> a stream, river, ditch or drain <input checked="" type="checkbox"/> a legally established County Drain Date Drain was established 1890 <input type="checkbox"/> a channel/canal <input type="checkbox"/> 500 feet of an existing water body	<input type="checkbox"/> a Great Lake or Section 10 Waters <input checked="" type="checkbox"/> a wetland <input type="checkbox"/> a 100-year floodplain <input type="checkbox"/> a dam <input type="checkbox"/> a designated high risk erosion area <input type="checkbox"/> a designated critical dune area <input type="checkbox"/> a designated environmental area
Project Use	
<input type="checkbox"/> private <input type="checkbox"/> commercial <input checked="" type="checkbox"/> public/government <input type="checkbox"/> project is receiving federal/state transportation funds <input type="checkbox"/> Wetland Restoration <input type="checkbox"/> other	

Indicate the type of permit being applied for: General Permit Minor Project Individual (All other projects.) ➔ See Appendix C.

Written Summary of All Proposed Activities **Excavate a small trench 40' long, 1.5 feet wide (bottom width), 2 foot wide top width, and 0.1 to 0.5 foot deep within wetlands to provide flooding relief to nearby condominiums. Wetland impact area totals approximately 0.001 acre, through removal of 1.4 cubic yards of material. Project plans are attached.**

Construction Sequence and Methods **Construction will be accomplished using a small, micro-excavator. Equipment will access and leave the site from adjacent upland. All excess spoils will be removed from the wetland and placed at an upland location. Project is to be completed in one day.**





4 Project Purpose, Use and Alternatives *Attach additional sheets as necessary.*

Describe the purpose of the project and its intended use; include any new development or expansion of an existing land use.

Maintained lawn areas adjacent to Coyote Creek Condominiums routinely flood due to spring melt, precipitation, and lack of an outlet to adjacent wetlands. The purpose of this work is to remove a small high point in the adjacent wetland to allow flood waters to recede from adjacent condominiums. The work is being completed by the Ingham County Drain Commissioner under the Smith Consolidated Drain Project.

Describe the alternatives considered to avoid or minimize resource impacts. Include factors such as, but not limited to, alternative locations, project layout and design, and construction technologies. For utility crossings include alternative routes and construction methods.

The alternative chosen represents minimal physical impact to the wetlands, does not require fill or elimination of any wetland areas, and will not alter wetland hydrology. The size of the trench is small (0.001 acre of wetland impact), and is designed at a depth to move seasonal flood waters from the condominium commons area. All spoils will be removed from the wetlands and placed at an upland location.

5 Locating Your Project Site *Attach a legible black and white map with a North arrow.*

Names of roads of closest intersection *Coyote Creek Drive and Okemose Road*

Directions from main intersection to the project site, with distances from the best and nearest visible landmark and water body *See attached site location map.*

Description of buildings on the site (color; 1 or 2 story, other)
See attached site location map.

Description of adjacent landmarks or buildings (address; color; etc)
See attached site location map.

How can your site be identified if there is no visible address? *See attached site location map.*

6 Easements and Other Permits

No Yes Is there a conservation easement or other easement, deed restriction, lease, or other encumbrance upon the property?
 ➔ If yes, attach a copy. Provide copies of court orders and legal lake levels if applicable.

List all other federal, interstate, state, or local agency authorizations including required assurances for Critical Dune Area projects.

Agency	Type of Approval	Number	Date Applied	Date approved /denied	Reason for denial
<i>All other necessary permits will be obtained prior to initiating work.</i>					

7 Compliance

If a permit is issued, when will the activity begin? (M/D/Y) *Immediately upon issuance* Proposed completion date (M/D/Y) *The same day as work begins.*

No Yes Has any construction activity commenced or been completed in a regulated area?
 ➔ If Yes, identify the portion(s) underway or completed on drawings or attach project specifications and give completion date(s).

No Yes Were the regulated activities conducted under a DEQ and/or USACE permit?
 ➔ If Yes, list the permit numbers

No Yes Are you aware of any unresolved violations of environmental law or litigation involving the property?
 ➔ If Yes, attach explanation.

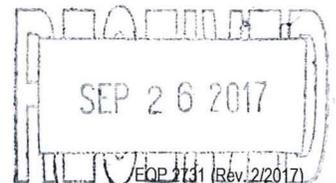
8 Adjoining Property Owners *Provide current mailing addresses. Attach additional sheets/labels for long lists.*

<input type="checkbox"/> Established Lake Board	Contact Person	Mailing Address	City	State and Zip Code
<input type="checkbox"/> Lake Association				

List all adjoining property owners.

If you own the adjoining lot, provide the requested information for the first adjoining parcel that is not owned by you.

Property Owner's Name	Mailing Address	City	State and Zip Code
<i>All work is being completed within ICDC easements.</i>			





9

Applicant's Certification

Read carefully before signing.

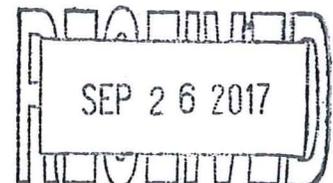
I am applying for a permit(s) to authorize the activities described herein. I certify that I am familiar with the information contained in this application; that it is true and accurate; and, to the best of my knowledge, that it is in compliance with the State Coastal Zone Management Program. I understand that there are penalties for submitting false information and that any permit issued pursuant to this application may be revoked if information on this application is untrue. I certify that I have the authority to undertake the activities proposed in this application. By signing this application, I agree to allow representatives of the DEQ, USACE, and/or their agents or contractors to enter upon said property in order to inspect the proposed activity site before and during construction and after the completion of the project. I understand that I must obtain all other necessary local, county, state, or federal permits and that the granting of other permits by local, county, state, or federal agencies does not release me from the requirements of obtaining the permit requested herein before commencing the activity. I understand that the payment of the application fee does not guarantee the issuance of a permit.

- Property Owner
- Agent/Contractor
- Corp. or Public Agency / Title

Printed Name
Michael B Nurse

Signature


Date
9/22/2017





10 Projects Impacting Inland Lakes, Streams, Great Lakes, Wetlands or Floodplains

- Complete only those sections A through M applicable to your project.
- If your project impacts wetlands also complete Section 12. If your project impacts regulated floodplains also complete Section 13.
- To calculate volume in cubic yards (cu yd), multiply the average length in feet (ft) times the average width (ft) times the average depth (ft) and divide by 27. Example: (25 ft long x 10 ft wide x 2 feet deep) / 27 = 18.5 cubic yards
- Some projects on the Great Lakes require an application for conveyance prior to Joint Permit Application completeness.
 - ➔ Provide a black and white overall site plan, with cross-section and profile drawings. Show existing lakes, streams, wetlands, and other water features; existing structures; and the location of all proposed structures, land change activities and soil erosion and sedimentation control measures. Review Appendix B and EZ Guides for aid in providing complete site-specific drawings.
 - ➔ Provide tables for multiple impact areas or multiple activities such as multiple fill areas or multiple culverts. Include your calculations.

Water Level Elevation

On inland waters NGVD 29 NAVD 88 other **Na** Observed water elevation (ft) **Na** date of observation (M/D/Y) **Na**
 On a Great Lake IGLD 85 surveyed converted from observed still water elevation.

A. PROJECTS REQUIRING FILL (See All Sample Drawings)

- ➔ Attach a site plan and cross-section views to scale showing maximum and average fill dimensions with calculations.
- ➔ For multiple impact areas on a site provide a table with location, dimensions and volumes for each fill area.

Purpose	<input type="checkbox"/> bioengineered shore protection	<input type="checkbox"/> boat ramp	<input type="checkbox"/> boat well	<input type="checkbox"/> bridge or culvert	<input type="checkbox"/> crib dock
	<input type="checkbox"/> riprap	<input type="checkbox"/> seawall	<input type="checkbox"/> swim area	<input type="checkbox"/> other	
Dimensions of fill (ft)	Total volume (cubic yards)		Volume below OHWM (cubic yards)		
Length Width Maximum Depth					
Maximum water depth in fill area (ft)	Area filled (sq ft)		Will filter fabric be used under proposed fill? <input type="checkbox"/> No <input type="checkbox"/> Yes (If Yes, type)		
Fill will extend	feet into the water from the shoreline and upland	feet out of the water.			

Type of clean fill peastone % sand % gravel % other

Source of clean fill commercial on-site ➔ If on-site, show location on site plan.
 other ➔ If other, attach description of location.

B. PROJECTS REQUIRING DREDGING OR EXCAVATION (See Sample Drawings)

- Refer to www.mi.gov/jointpermit for spoils disposal and authorization requirements.
- ➔ Attach a site plan and cross-section views to scale showing maximum and average dredge or excavation dimensions with calculations.
- ➔ For multiple impact areas on a site provide a table with location, dimensions and volumes for each dredge/excavation area.

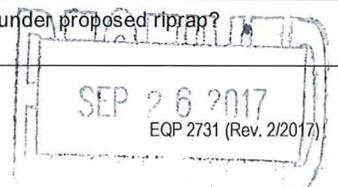
Purpose	<input type="checkbox"/> boat ramp	<input type="checkbox"/> boat well	<input type="checkbox"/> bridge or culvert	<input type="checkbox"/> maintenance dredge
	<input type="checkbox"/> navigation	<input type="checkbox"/> pond/basin	<input checked="" type="checkbox"/> other Aleviate flooding	
Dimensions (ft)	Total volume (cu yds)		Volume below OHWM (cu yds)	
Length 40 Width 1.5 (Bottom); 2 (top) Maximum Depth 0.5	1.4		na	
Has this same area been previously dredged?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	If Yes, provide date and permit number:		
Will the previously dredged area be enlarged?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	If Yes, when and how much?		
Is long-term maintenance dredging planned?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	If Yes, how often?		

Dredge or Excavation Method Hydraulic Mechanical other

Spoils Disposal	Dredged or excavated spoils will be placed <input checked="" type="checkbox"/> on-site <input type="checkbox"/> landfill <input type="checkbox"/> USACE confined disposal facility <input type="checkbox"/> other upland off-site For disposal, provide a ➔ Detailed spoils disposal area location map and site plan with property lines. ➔ Letter of authorization from property owner of spoils disposal site, if disposed off-site.
	For volumes less than 5,000 cu yards, has proposed dredge material been tested for contaminants within the past 10 years? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes ➔ If Yes, provide test results with a map of sampling locations.

C. PROJECTS REQUIRING RIPRAP (See Sample Drawings 2, 3, 8, 12, 14, 22, and 23)

Riprap water ward of the ordinary high water mark: dimensions (ft) length width depth	Volume(cu yd)
Riprap landward of the ordinary high water mark: dimensions (ft) length width depth	Volume(cu yd)
Type and size of riprap (inches) <input type="checkbox"/> field stone <input type="checkbox"/> angular rock <input type="checkbox"/> other	Will filter fabric or pea stone be used under proposed riprap? <input type="checkbox"/> No <input type="checkbox"/> Yes, Type





12 Activities That May Impact Wetlands (See Sample Drawings 8 & 9). Complete other Sections as applicable.

- Locate your site and wetland information with the DEQ Wetlands Map Viewer at www.mcqi.state.mi.us/wetlands/
- For information on the DEQ's Wetland Identification Program (WIP) visit www.mi.gov/wetlands.
 - ➔ Provide a detailed site plan with labeled property lines, upland and wetland areas, and dimensions and volumes of wetland impacts.
 - ➔ Complete the wetland dredge and wetland fill dimension information below for each impacted wetland area.
 - ➔ Attach tables for multiple impact areas or activities.
 - ➔ Attach at least one cross-section for each wetland dredge and/or fill area; show wetland and upland boundaries on the cross-section.

Has the DEQ conducted a wetland assessment for this parcel?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	➔ If Yes, provide a copy or WIP number:
Has a professional wetland delineation been conducted for this parcel?	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	➔ If Yes, provide a copy with data sheets
Is there a recorded DEQ easement on the property?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	➔ If Yes, provide the easement number
Did the applicant purchase the property before October 1, 1980?	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	➔ If Yes, provide documentation.
Is any grading or mechanized land clearing proposed?	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	➔ If Yes, label the locations on the site plan.
Has any of the proposed grading or mechanized land clearing been completed?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	➔ If Yes, label the locations on the site plan

Proposed Activity	<input type="checkbox"/> boardwalk or deck (Section 10I)	<input type="checkbox"/> bridges and culverts (Section 14)	<input type="checkbox"/> designated environmental area
	<input type="checkbox"/> dewatering	<input checked="" type="checkbox"/> draining surface water	<input type="checkbox"/> driveway / road
	<input type="checkbox"/> fences (Section 10L)	<input type="checkbox"/> fill or dredge	<input type="checkbox"/> restoration
	<input type="checkbox"/> septic system	<input type="checkbox"/> stormwater discharge (Section 10J)	<input checked="" type="checkbox"/> other Aleviate flooding

FILL	Dimensions maximum length (ft) maximum width (ft)	Area <input type="checkbox"/> acres <input type="checkbox"/> sq ft	Average depth (ft)	Volume (cu yd)
DREDGE	Dimensions maximum length (ft) 40 maximum width (ft) 2.0	Area <input checked="" type="checkbox"/> acres <input type="checkbox"/> sq ft 0.001	Average depth (ft) 0.5	Volume (cu yd) 1.4

Spoils Disposal	Dredged or excavated spoils will be placed <input checked="" type="checkbox"/> on-site <input type="checkbox"/> landfill <input type="checkbox"/> USACE confined disposal facility <input checked="" type="checkbox"/> other upland off-site
	For disposal, provide a ➔ Detailed spoils disposal area location map and site plan with property lines. ➔ Letter of authorization from property owner of spoils disposal site, if disposed off-site.

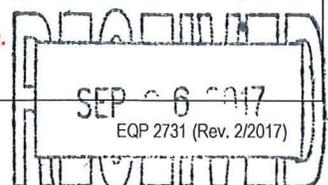
Septic System	The proposed project will be serviced by: <input type="checkbox"/> public sewer <input type="checkbox"/> private septic system ➔ Show system on plans.	If a private septic system is proposed, has an application for a permit been made to the County Health Department? <input type="checkbox"/> No <input type="checkbox"/> Yes If Yes, has a permit been issued? <input type="checkbox"/> No <input type="checkbox"/> Yes ➔ Provide a copy of the permit.
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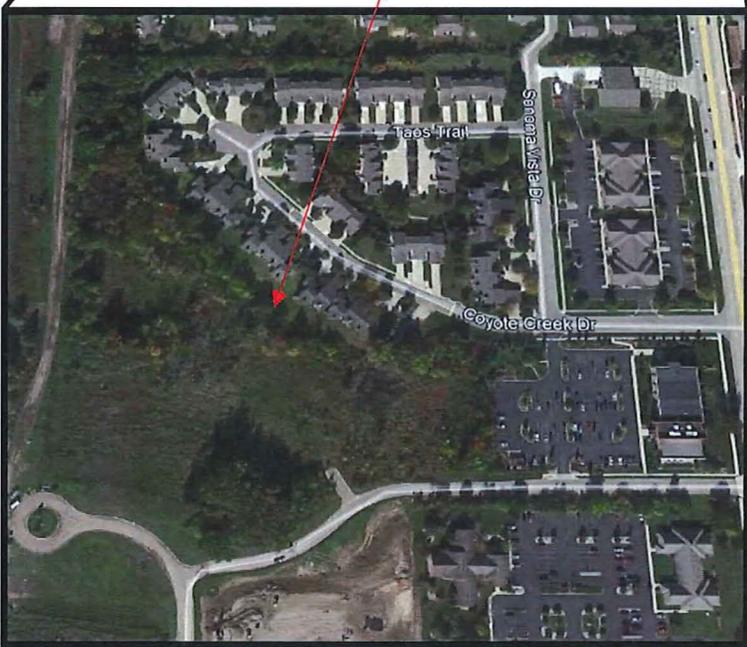
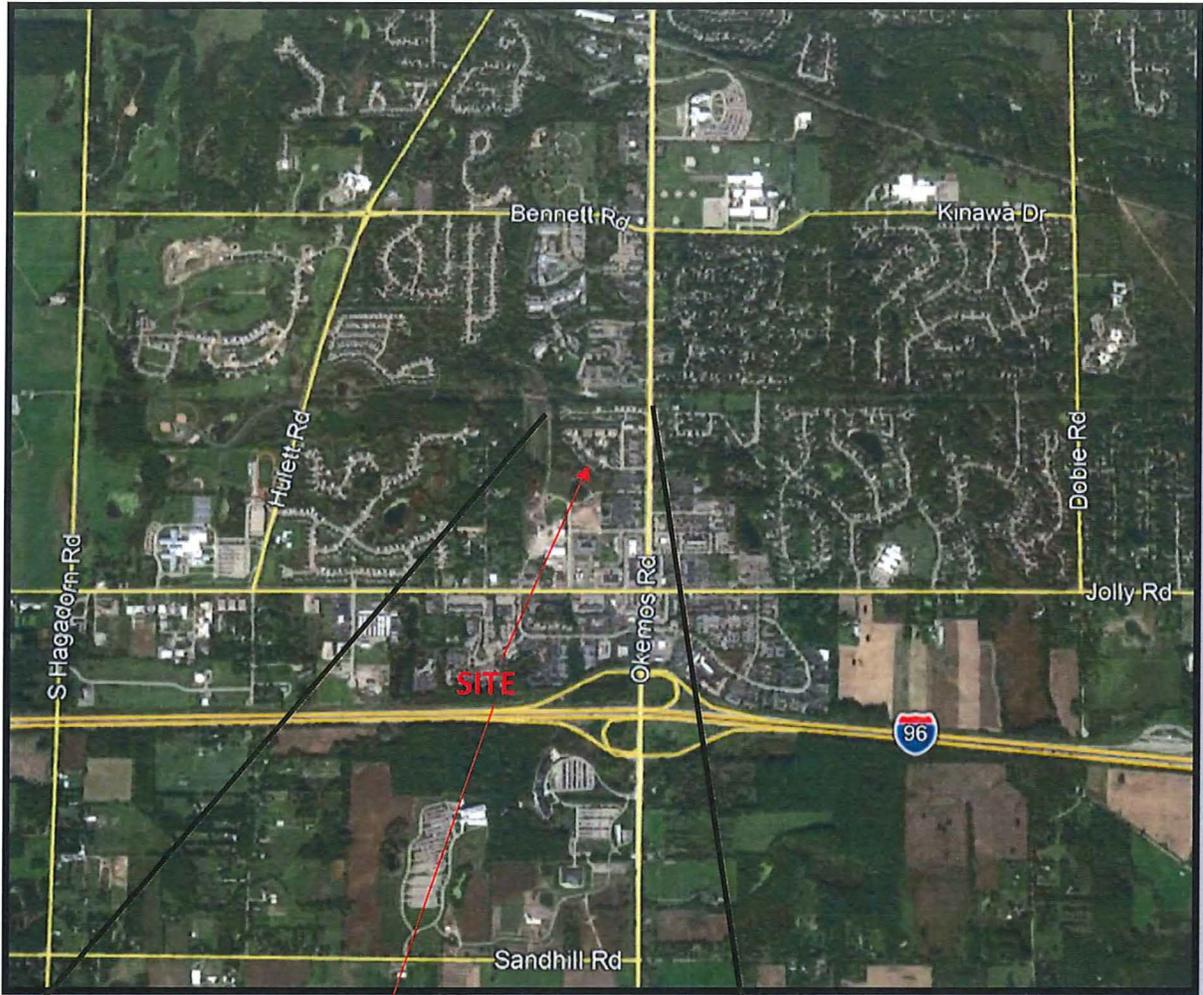
Describe the wetland impacts, the proposed use or development, and the alternatives considered:
See Section 4 above and impact discussion below.

Does the project impact more than 1/3 acre of wetland? No Yes
➔ If Yes, submit a Mitigation Plan with the type and amount of mitigation proposed. For more information go to www.mi.gov/wetlands

Describe how impacts to waters of the United States will be avoided and minimized:
See Section 4 above. The proposed work is designed to provide seasonal flood relief to a maintained lawn area adjacent to Coyote Creek Condominiums. The proposed work will not result in loss of wetland size or function. Disturbance involves a total of 1.4 cubic yards of material and 0.001 acre of wetland. The wetland is a combination of wet meadow and scrub shrub wetland with a few mature eastern cottonwood present. Due to the small area of impact, all mature trees will be avoided. All spoils will be removed from the wetland and placed at an upland location.

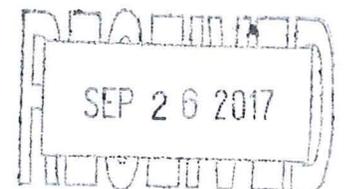
Describe how the impact to waters of the United States will be compensated. OR Explain why compensatory mitigation should not be required for the proposed impacts.
See Section 4 and discussion above. The proposed work will not result in loss of wetland size or function.





NORTH

SITE LOCATION MAP





September 28, 2017
Project No. 171723

Mr. Mark Kieselbach
Charter Township of Meridian
5151 Marsh Road
Okemos, MI 48864

Re: Wetland Use Permit (WUP) #17-01 Application Review
Ingham County Drain Commissioner
Coyote Creek Condominiums

Dear Mr. Kieselbach:

The Ingham County Drain Commissioner (ICDC) is requesting to excavate a small trench which will impact wetlands regulated by the Charter Township of Meridian (Township). The primary focus of the project is to move seasonal flood water across a small high point in a wetland to alleviate seasonal flooding in maintained lawn at the Coyote Creek Condominiums. The project is located in Section 33 of the Township and impacts Township Wetland No. 33-2, which is contiguous to the Smith Consolidated Drain (Drain).

At the request of the Township, FTCH reviewed a Joint Permit Application, dated September 22, 2017, prepared by Streamside Ecological Services (SES).

This report provides a brief description of the resources that would be impacted by the proposed work, evaluates WUP Application #17-01 according to review standards in the Township Wetland Protection Ordinance (Article IV of Chapter 22 of the Code of Ordinances of the Charter Township of Meridian), and makes recommendations to the Township regarding issuance or denial of the WUP application.

Overview of Proposed Wetland Impacts

The proposed activities are located in the southwest quarter of Section 33, Town 4 North, Range 1 West, Ingham County, Michigan. Proposed impacts are located on Parcel Number 33-02-02-33-327-100. This parcel contains residential property, maintained lawn, and wetland. The wetland consists of wet meadow, scrub-shrub wetland and a few mature eastern cottonwood trees.

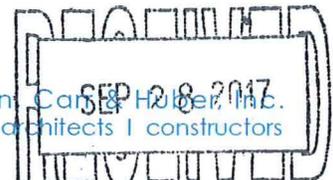
The ICDC has submitted a WUP application to the Township requesting the following:

- Excavation of wetland to create a 40-foot long ditch. The ditch will be 0.1 to 0.5 foot deep within wetland, and have a bottom width of 1.5 feet wide and top width of 2 feet. The total wetland impact area is approximately 0.001 acre, with removal of 1.4 cubic yards of soil.

Review of WUP Application

The review standards used to evaluate WUP applications are found in Section 22-157 of Article IV (Wetland Protection) of Chapter 22 of the Township's Code of Ordinances. WUPs are not to be issued unless the proposed activity is found to be in the public interest, the permit is necessary to realize the benefits from the activity, and the proposed activity is otherwise lawful in all respects. Section 22-157(2) lists eleven general criteria to be considered when evaluating whether or not a proposed activity is in the public interest. An evaluation of the proposed activity, according to each of the eleven criteria, is as follows:

Section 22-157(2)(a) *The relative extent of the public and private need for the proposed activity.*





- There is a private need for the proposed wetland excavation. The primary goal of the project is to drain seasonal flooding on maintained lawn at a residential development.

Section 22-157(2)(b) *The availability of feasible and prudent alternative locations and methods to accomplish the expected benefits from the activity.*

- The permit application did not indicate any other feasible and prudent alternatives. The permit application noted that the chosen alternative results in minimal physical impact to the wetland, does not require fill or elimination of wetland areas, and will not alter wetland hydrology.

Section 22-157(2)(c) *The extent and permanence of the beneficial or detrimental effects which the proposed activity may have on the public and private uses to which the area is suited, including the benefits the wetlands provide.*

- The proposed project provides a permanent beneficial effect to Coyote Creek Condominiums through removal of seasonal surface water on maintained lawn.
- The proposed project does not significantly alter wetland hydrology within the impacted wetland. Wetland impact is limited to approximately 0.001 acre. It is expected that wetland vegetation will reestablish from the existing seedbank within the excavated ditch. Therefore, no detrimental effect to wetland functions and values is anticipated due to creation of the ditch.

Section 22-157(2)(d) *The probable impact of each proposal in relation to the cumulative effect created by other existing and anticipated activities in the watershed.*

- Proposed ditch excavation would occur concurrently with significant upgrades to the Drain under WUP 16-01. The relative impact of ditch creation in relation to the cumulative effect of WUP 16-01 activities is very minor.

Section 22-157(2)(e) *The probable impact on recognized historic, cultural, scenic, ecological, or recreational values and on the public health or safety, or fish or wildlife.*

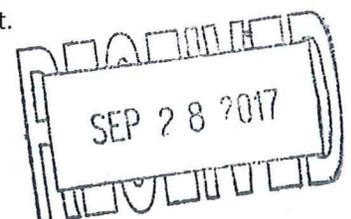
- Removal of standing water from the condominium lawn may reduce mosquito populations and the public health effects associated with this insect.
- Removal of standing water from the condominium lawn will improve the recreational value of this open space.
- Construction of the proposed ditch is not likely to change the ecological character of the associated wetland and will have no impact on fish and wildlife.
- No other impacts on recognized historic, cultural, scenic, or recreational values or on public health and safety are apparent for the proposed activity.

Section 22-157(2)(f) *Economic value, both public and private, of the proposed land change to the general township area.*

- The proposed land change protects against flooding at Coyote Creek Condominiums, which provides positive private economic value to the general township area.

Section 22-157(2)(g) *The size and quality of the wetland being considered.*

- The proposed land change impacts 0.001 acre of wet meadow and scrub-shrub wetland. The impacted wetland is located within Meridian Township Wetland No. 33-2, an approximately 52-acre, emergent/scrub-shrub/forested wetland complex located along the Drain.
- No loss of wetland area or change in wetland type is anticipated as a result of this project.





Section 22-157(2)(h) *The findings of necessity for the proposed activity which have been made by other agencies.*

- FTCH is not aware of any findings of necessity for the proposed activity which have been made by other agencies.

Section 22-157(2)(i) *Amount of wetland remaining in the general area and proximity to a waterway.*

- The proposed work occurs within an approximately 52-acre, emergent/scrub-shrub, forested wetland complex located contiguous to the Drain.

Section 22-157(2)(j) *Proximity to any waterbody.*

- The proposed wetland ditch is located approximately 420 feet east of the Drain.

Section 22-157(2)(k) *Extent to which upland soil erosion adjacent to the protected wetland is controlled.*

- Soil erosion control measures were not discussed in the permit application. Ditch excavation would be completed in one day using a micro-excavator. Adjacent upland contains turf and appears to be currently stable. The only apparent potential source of erosion associated with this project is within the excavated ditch.

Recommendations

Based upon our review of the submitted materials, it is our opinion that the proposed project meets the Township's requirements for permit issuance. FTCH recommends the WUP permit be issued with the following conditions:

- Ensure that excavated soil be removed from the wetland and placed in an upland location.
- Implement appropriate Soil Erosion and Sedimentation Control measures during construction to ensure there are no impacts to wetlands outside of project activities as a result of soil erosion. These measures include installation of straw blanket and a cover crop of annual grasses within the ditch. It is assumed that the ditch will reseed from the surrounding wet meadow and hand seeding of perennial wetland species will not be necessary.

We appreciate the opportunity to assist in the review of this file. If you have any questions or require additional information, please contact me at 616.464.3738 or ehtripp@ftch.com.

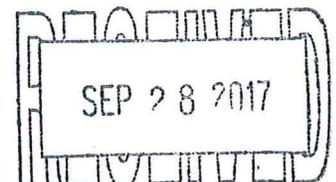
Sincerely,

FISHBECK, THOMPSON, CARR & HUBER, INC.

A handwritten signature in black ink that reads "Elise Hansen Tripp". The signature is written in a cursive, flowing style.

Elise Hansen Tripp, PWS

pmb
By email





MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER RESOURCES DIVISION
MINOR PROJECT PERMIT

Issued To:

Mr. Patrick Lindemann, Ingham County Drain Commissioner
707 Buhl
Mason, Michigan 48854

Permit No.: WRP008847 v.1
Submission No.: HN8-3C0Y-8X7PT
Site Name: Coyote Creek Wetlands
Issued: September 25, 2017
Revised:
Expires: September 25, 2022

This permit is being issued by the Michigan Department of Environmental Quality (MDEQ), Water Resources Division, under the provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA); specifically:

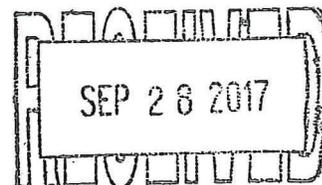
- Part 301, Inland Lakes and Streams
Part 303, Wetlands Protection
Part 315, Dam Safety
Part 31, Water Resources Protection (Floodplain Regulatory Authority)
Part 323, Shorelands Protection and Management
Part 325, Great Lakes Submerged Lands
Part 353, Sand Dunes Protection and Management

Permission is hereby granted, based on permittee assurance of adherence to State of Michigan requirements and permit conditions, to:

Authorized Activity:

Excavate 1.4 cubic yards of soils from a 2 foot wide by 40 foot long area to a depth of 6-inches on Coyote Creek Drive.
Stabilize with native Michigan wetland seed mix.

Authorized Under Minor Permit Category: Minor Permit Category #32
Water Course Affected: Waterbody Name: Wetland
Property Location: Ingham County, Meridian Charter Township,
Town/Range/Section: 04N01W33



Authority granted by this permit is subject to the following limitations:

- A. Initiation of any work on the permitted project confirms the permittee's acceptance and agreement to comply with all terms and conditions of this permit.
B. The permittee, in exercising the authority granted by this permit, shall not cause unlawful pollution as defined by Part 31 of the NREPA.
C. This permit shall be kept at the site of the work and available for inspection at all times during the duration of the project or until its date of expiration.
D. All work shall be completed in accordance with the approved plans and specifications submitted with the application and/or plans and specifications attached to this permit.

- E. No attempt shall be made by the permittee to forbid the full and free use by the public of public waters at or adjacent to the structure or work approved.
- F. It is made a requirement of this permit that the permittee give notice to public utilities in accordance with 2013 PA 174 (Act 174) and comply with each of the requirements of Act 174.
- G. This permit does not convey property rights in either real estate or material, nor does it authorize any injury to private property or invasion of public or private rights, nor does it waive the necessity of seeking federal assent, all local permits, or complying with other state statutes.
- H. This permit does not prejudice or limit the right of a riparian owner or other person to institute proceedings in any circuit court of this state when necessary to protect his rights.
- I. Permittee shall notify the MDEQ within one week after the completion of the activity authorized by this permit by completing and forwarding the attached preaddressed postcard to the office addressed thereon.
- J. This permit shall not be assigned or transferred without the written approval of the MDEQ.
- K. Failure to comply with conditions of this permit may subject the permittee to revocation of permit and criminal and/or civil action as cited by the specific state act, federal act, and/or rule under which this permit is granted.
- L. All dredged or excavated materials shall be disposed of in an upland site (outside of floodplains, unless exempt under Part 31 of the NREPA, and wetlands).
- M. In issuing this permit, the MDEQ has relied on the information and data that the permittee has provided in connection with the submitted application for permit. If, subsequent to the issuance of a permit, such information and data prove to be false, incomplete, or inaccurate, the MDEQ may modify, revoke, or suspend the permit, in whole or in part, in accordance with the new information.
- N. The permittee shall indemnify and hold harmless the State of Michigan and its departments, agencies, officials, employees, agents, and representatives for any and all claims or causes of action arising from acts or omissions of the permittee, or employees, agents, or representative of the permittee, undertaken in connection with this permit. The permittee's obligation to indemnify the State of Michigan applies only if the state: (1) provides the permittee or its designated representative written notice of the claim or cause of action within 30 days after it is received by the state, and (2) consents to the permittee's participation in the proceeding on the claim or cause of action. It does not apply to contested case proceedings under the Administrative Procedures Act, 1969 PA 306, as amended, challenging the permit. This permit shall not be construed as an indemnity by the State of Michigan for the benefit of the permittee or any other person.
- O. Noncompliance with these terms and conditions and/or the initiation of other regulated activities not specifically authorized shall be cause for the modification, suspension, or revocation of this permit, in whole or in part. Further, the MDEQ may initiate criminal and/or civil proceedings as may be deemed necessary to correct project deficiencies, protect natural resource values, and secure compliance with statutes.
- P. If any change or deviation from the permitted activity becomes necessary, the permittee shall request, in writing, a revision of the permitted activity from the MDEQ. Such revision request shall include complete documentation supporting the modification and revised plans detailing the proposed modification. Proposed modifications must be approved, in writing, by the MDEQ prior to being implemented.
- Q. This permit may be transferred to another person upon written approval of the MDEQ. The permittee must submit a written request to the MDEQ to transfer the permit to the new owner. The new owner must also submit a written request to the MDEQ to accept transfer. The new owner must agree, in writing, to accept all conditions of the permit. A single letter signed by both parties that includes all of the above information may be provided to the MDEQ. The MDEQ will review the request and, if approved, will provide written notification to the new owner.
- R. Prior to initiating permitted construction, the permittee is required to provide a copy of the permit to the contractor(s) for review. The property owner, contractor(s), and any agent involved in exercising the permit are held responsible to ensure that the project is constructed in accordance with all drawings and specifications. The contractor is required to provide a copy of the permit to all subcontractors doing work authorized by the permit.
- S. Construction must be undertaken and completed during the dry period of the wetland. If the area does not dry out, construction shall be done on equipment mats to prevent compaction of the soil.
- T. Authority granted by this permit does not waive permit requirements under Part 91, Soil Erosion and Sedimentation Control, of the NREPA, or the need to acquire applicable permits from the County Enforcing Agent (CEA).
- U. Authority granted by this permit does not waive permit requirements under the authority of Part 305, Natural Rivers, of the NREPA. A Natural Rivers Zoning Permit may be required for construction, land alteration, streambank stabilization, or vegetation removal along or near a natural river.

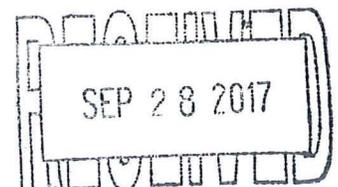
- V. The permittee is cautioned that grade changes resulting in increased runoff onto adjacent property is subject to civil damage litigation.
- W. Unless specifically stated in this permit, construction pads, haul roads, temporary structures, or other structural appurtenances to be placed in a wetland or on bottomland of the water body are not authorized and shall not be constructed unless authorized by a separate permit or permit revision granted in accordance with the applicable law.
- X. For projects with potential impacts to fish spawning or migration, no work shall occur within fish spawning or migration timelines (i.e., windows) unless otherwise approved in writing by the Michigan Department of Natural Resources, Fisheries Division.
- Y. Work to be done under authority of this permit is further subject to the following special instructions and specifications:
 1. Authority granted by this permit does not waive permit or program requirements under Part 91 of the NREPA or the need to acquire applicable permits from the CEA. To locate the Soil Erosion Program Administrator for your county, visit www.mi.gov/deqstormwater and select "Soil Erosion and Sedimentation Control Program" under "Related Links."
 2. The authority to conduct the activity as authorized by this permit is granted solely under the provisions of the governing act as identified above. This permit does not convey, provide, or otherwise imply approval of any other governing act, ordinance, or regulation, nor does it waive the permittee's obligation to acquire any local, county, state, or federal approval or authorization necessary to conduct the activity.
 3. No fill, excess soil, or other material shall be placed in any wetland, floodplain, or surface water area not specifically authorized by this permit, its plans, and specifications.
 4. This permit does not authorize or sanction work that has been completed in violation of applicable federal, state, or local statutes.
 5. The permit placard shall be kept posted at the work site, in a prominent location at all times for the duration of the project, or until permit expiration.
 6. This permit is being issued for the maximum time allowed and no extensions of this permit will be granted. Initiation of the construction work authorized by this permit indicates the permittee's acceptance of this condition. The permit, when signed by the MDEQ, will be for a five-year period beginning on the date of issuance. If the project is not completed by the expiration date, a new permit must be sought.
 7. Upon completion of the project, the disturbed wetland areas shall be seeded with species native to Michigan appropriate to the site, and mulched to prevent erosion.



Issued By: _____

Carol Valor
 Lansing District Office
 Water Resources Division
 517-284-6670

cc: Meridian Charter Township Clerk
 Ingham County Drain Commissioner
 Ingham County CEA





NOTICE OF AUTHORIZATION

Permit Number: WRP008847 v. 1
Site Name: Coyote Creek Wetlands

Date Issued: September 25, 2017
Expiration Date: September 25, 2022

The Michigan Department of Environmental Quality, Water Resources Division, P.O. Box 30458, Lansing, Michigan 48909-7958, under provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended; specifically:

- Part 31, Floodplain Regulatory Authority of the Water Resources Protection.
- Part 301, Inland Lakes and Streams.
- Part 303, Wetlands Protection.
- Part 315, Dam Safety.

Authorized activity:

Excavate 1.4 cubic yards of soils from a 2 foot wide by 40 foot long area to a depth of 6-inches on Coyote Creek Drive.

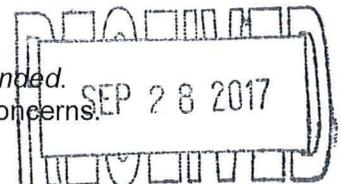
Stabilize with native Michigan wetland seed mix.

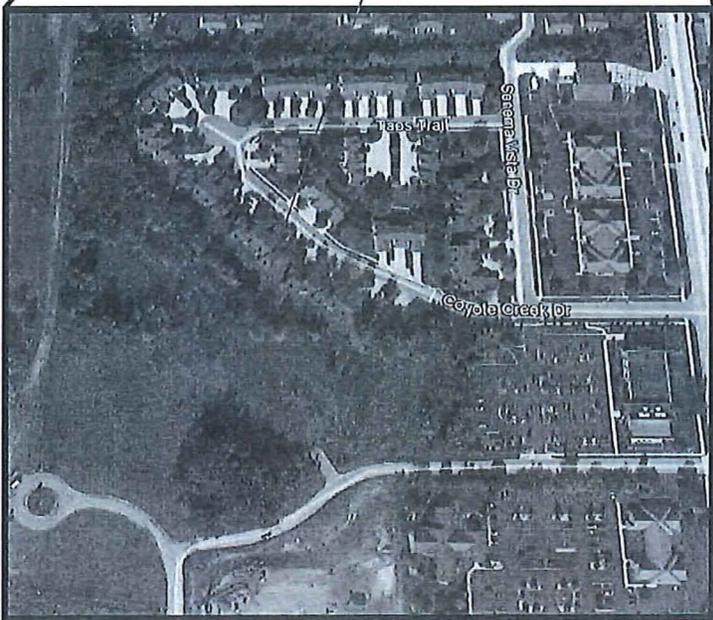
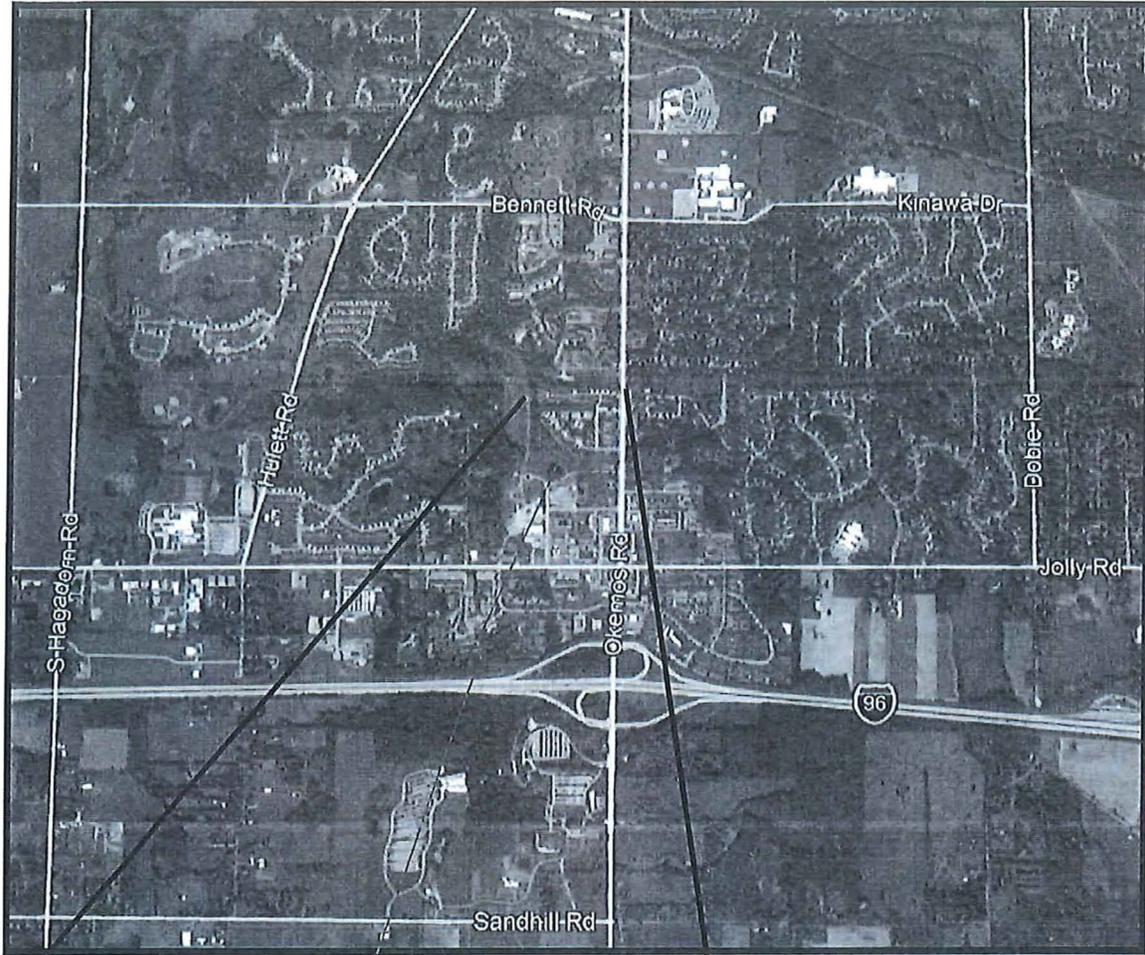
To be conducted at property located in: Ingham County, Waterbody: Wetland
Section 33, Town 04N, Range 01W, Meridian Charter Township

Permittee:
Mr. Patrick Lindemann
Ingham County Drain Commissioner
707 Buhl
Mason, MI 48854

Carol Valor
Lansing District Office
Water Resources Division
517-284-6670

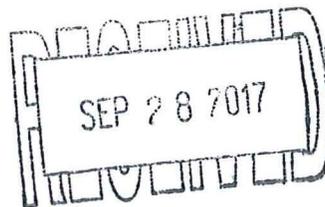
*This notice must be displayed at the site of work.
Laminating this notice or utilizing sheet protectors is recommended.*
Please refer to the above permit number with any questions or concerns.





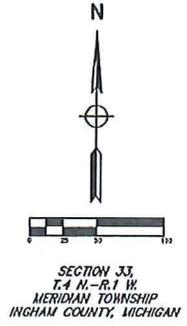
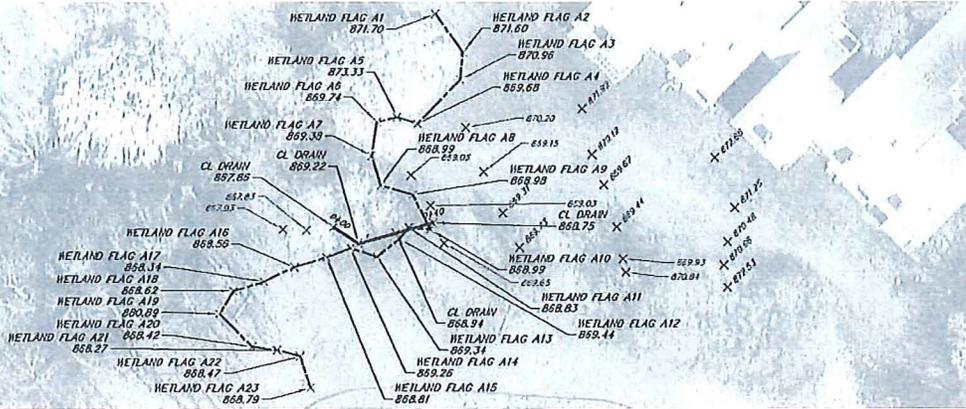
NORTH

SITE LOCATION MAP



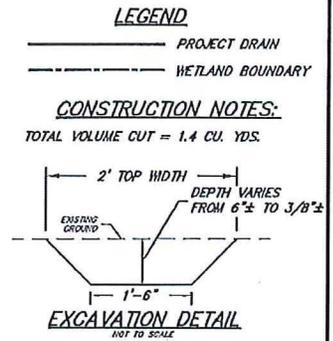
DEQ-WRD
APPROVED PLANS
Permit # WRP00847
Issued 9/25 2017
Page 1 of 2

EXHIBIT A



875	STA 0+00 CL DRAIN CL 868.25	STA 0+15 CL DRAIN CL 868.25	STA 0+30 CL DRAIN CL 868.25	STA 0+40 CL DRAIN CL 868.25	875
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865	RISE 2.23 FEET PER 100 FEET				865
860					860
855					855
	0+00			0+40	

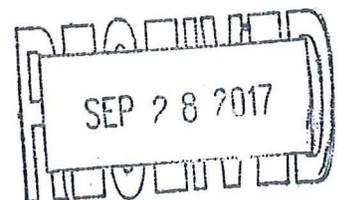
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PRELIMINARY



DEQ-WRD
 APPROVED PLANS
 Permit # WR P008847
 Issued 9/25/2017
 Page 2 of 2



Environmental Commission Strategic Plan 2017

The purpose of the Environmental Commission includes promoting the wise management of natural resources, a healthy environment, long term economic health, and ensuring compliance with applicable local, state, and federal laws and policies (such as Wetland Use Permit Reviews).

Along with the Goals and Objectives below, the Environmental Commission will continue its routine public engagement activities that include the Environmental Stewardship Awards and "Green Theme" Presentations.

Collaborative Goal: *More actively collaborate with the Land Preservation Board, Park Board, and Planning Commission in promoting the wise management of natural resources in the Township. This effort will be strengthened with increased mutual data-sharing, reporting, and information gathering.*

Collaborative Objectives

1. Regularly engage the chairs of the Land Preservation Board, Park Board, and Planning Commission to align data needs and other planning tools related to environmental protection, land acquisition, and land improvement. (continual)

Policy Recommendation Goal: *Engage residents, businesses, and fellow appointed and elected officials in making recommendations on environmental planning issues and the sharing of ideas.*

Policy Recommendation Objectives

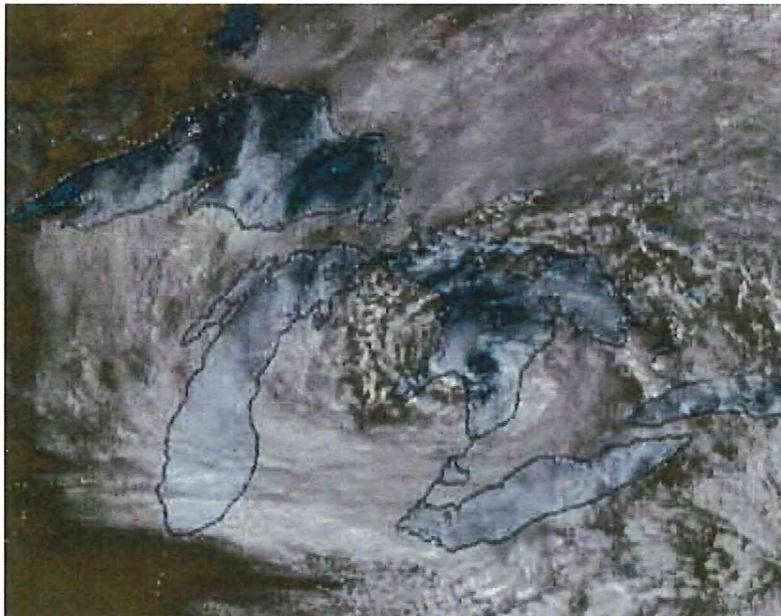
1. Improved wayfinding throughout the Township for pathways, businesses, parks etc. Partner with Parks, Engineering, and the DDA to promote improved signage and/or electronic applications for wayfinding related to parks, pathways, and other cultural amenities in the Township. (ongoing)
2. Zoning ordinance updates that address climate change, brownfield redevelopment, and street tree replacement. (mid to long term)
3. Create and share planning tools such as maps and data that aid environmental planning decision-making. (mid to long term)
4. Adopt Climate Action Plan.



Meridian Township

Climate Sustainability Plan

Meeting Our Climate Action and Green Community Goals



Draft
8/3/2017

Contents

Executive Summary	3
Introduction	4
Climate Action	4
Purpose, Scope, and Process	5
Sustainability Plan, Programs, Policies, and Progress to Date	6
a. Energy Efficiency	6
b. Renewable Energy	8
c. Recycling and Waste Reduction	10
d. Transportation	12
e. Water Management	14
f. Monitoring and Evaluation	16
Conclusion	17
Acknowledgements	17

Executive Summary

In 2007, Meridian Township joined over 1000 communities in signing the U.S. Mayors Climate Protection Agreement. This plan describes many of the activities that have been done during the past 10 years to implement that agreement. The Meridian Township Board adopted a resolution of support for the Paris Climate Accord on June 20, 2017. Consistent with the Accord, many national, state, and local governments have established goals to reduce greenhouse gas emissions by 80% or more by 2050 compared to 2005 levels with an objective of a maximum global average temperature rise of 1.5°C to 2°C.¹ This is also the long-term goal of this plan.

Climate change is largely attributed to greenhouse gases, such as CO₂, released from burning fossil fuels. Climate change is predicted to have many impacts on our weather, our health, and our economy. These include flooding, poor air quality, negative impact on trees, and increased infectious diseases. One of the most significant impacts in Meridian Township will be more major rain events that lead to flooding.

Meridian Township has a long history of environmental stewardship. The Climate Sustainability Plan provides a framework for continuing and expanding this legacy. Implementation of this plan will enable Meridian Township to:

- Contribute to the worldwide efforts to curb greenhouse gas emissions.
- Make our community a more sustainable, resilient, affordable, and vibrant place to live.
- Make our township government operations more energy and resource efficient and better prepared to deal with the impacts of climate change.

This plan requires many actions related to energy efficiency, renewable energy, recycling and waste reduction, transportation, and water management. This plan includes objectives to:

- Achieve significant energy and water cost savings in township facilities and vehicle fleet.
- Obtain 50% of electricity used for township operations from renewable energy sources by 2025 and 100% by 2035.
- Reduce the amount of materials sent to landfills by 10% in 5 years.

The Township Manager will work with township staff, Meridian Township Energy Team, Environmental Commission, Transportation Commission, and other township boards and commissions to define responsibilities for implementing the plan. Monitoring will be important to determine plan impacts and what is working. Objectives and strategies in this plan should be revisited at least every 5 years.

¹ https://en.wikipedia.org/wiki/Paris_Agreement

Introduction

The Meridian Township Board adopted a resolution of support for the Paris Climate Accord on June 20, 2017. Consistent with the Accord, many national, state, and local governments have established goals to reduce greenhouse gas emissions by 80% or more by 2050 compared to 2005 levels with an objective of a maximum global average temperature rise of 1.5°C to 2°C.² This is also the long-term goal of this plan. Implementation of this plan will enable Meridian Township to:

- Contribute to the worldwide efforts to curb greenhouse gas emissions.
- Make our community a more sustainable, resilient, affordable, and vibrant place to live.
- Make our township government operations more energy and resource efficient and better prepared to deal with the impacts of climate change.

Achievement of this goal will require many actions related to energy efficiency, renewable energy, recycling and waste reduction, transportation, and water management. This plan includes objectives to:

- Achieve significant energy and water cost savings in township facilities and vehicle fleet.
- Obtain 50% of electricity used for township operations from renewable energy sources by 2025 and 100% by 2035.
- Reduce the amount of materials sent to landfills by 10% in 5 years.

In light of the urgency to mitigate climate change and the imperative to use tax dollars wisely, a plan to use resources as economically and efficiently as possible is essential.

Climate Action

In 2007, Meridian joined over 1000 communities in signing the U.S. Mayors Climate Protection Agreement. More recently, East Lansing, Grand Rapids, Ann Arbor, Traverse City, and others have developed Climate Action, Energy, and Resiliency Plans. Many of these are integrated in Comprehensive Plans. The Michigan Municipal League, Michigan Townships Association, State of Michigan, and others have launched a Green Communities Network to assist local governments in addressing environmental challenges including climate change.

Climate change is largely attributed to greenhouse gases, such as CO₂, released from burning fossil fuels such as coal, oil, and natural gas. Climate change is predicted to have many impacts on our weather, our health, and our economy. These include flooding (see Figure 1), poor air quality, negative impact on trees, increased infectious diseases, and increased wildfire risk. One of the most significant impacts in Meridian Township will be more major rain events that lead to flooding.

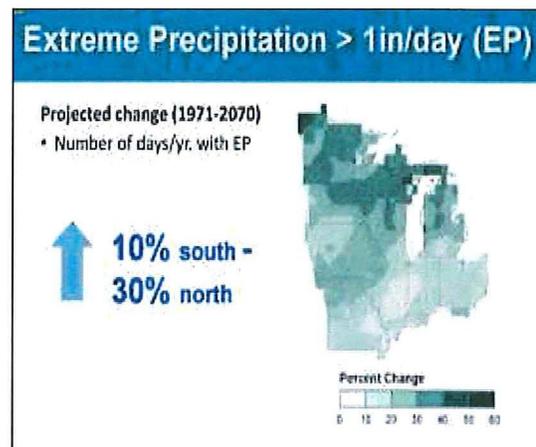


Figure 1: Great Lakes Integrated Sciences & Assessments (GLISA)

² https://en.wikipedia.org/wiki/Paris_Agreement

Predicted Changes in Michigan

Key Health Outcome	Biophysical Parameter Changes	Predicted Change
Respiratory Diseases	Air Pollutants Increase with high temps; Pollen, Mold levels increase with longer growing season & more moisture	↑
Heat Morbidity, Mortality	More frequent, longer Heat Events; Warmer minimum temperatures	↑
Injury, CO Poisoning	More frequent Ice Storms, Extreme Rain leading to more Power Outages & Cleanup; changes in other storm types unclear	↑ ?
Waterborne Diseases, Toxins	Algal blooms, other Flood-related contaminations more frequent	↑
Vector borne Diseases	Impact on Mosquito & Tick lifecycle unclear	?

Figure 2: MI Climate & Health Adaptation Program

While exact impacts cannot be predicted, long term trends are evident (see Figure 2) and call for an organized response – especially when climate adaptation and mitigation actions make communities more vibrant, affordable, sustainable, and resilient places to live.

This Plan includes strategies that can help reduce climate change impacts while saving money, saving energy, saving resources, and improving landscapes. These “actions of no regret” offer win-win opportunities that should be carried out regardless of opinions about the nature and threat of climate change.

“The climate is changing and we need to be more dynamic in our planning, especially in terms of extremes”

– Jeff Andresen, MSU Professor of meteorology/climatology and State Climatologist

Purpose, Scope, and Process

Meridian Township has a long history of environmental stewardship. The adoption of a Climate Sustainability Plan provides a framework for continuing and expanding this legacy. This Plan helps nurture this culture of environmental stewardship that influences all Township policies and actions.

The Plan focuses on five areas: Energy Efficiency, Renewable Energy, Recycling and Waste Reduction, Transportation, and Water Management. It offers a list of positive steps we can take now and lays out long-range objectives. It is intended to stimulate conversation, generate ideas, and evolve as new information and ideas emerge, and as more people become involved. Education and communication will be an important part of all areas of the Plan. The Township will use the web page, HOM-TV, public forums, and other means to make residents aware of current and proposed policies, programs and incentives.

As incorporated by reference in the Township’s Master Plan, the Climate Sustainability Plan is integrated with all Township government activities. Resource usage is a part of everything the Township and its staff does, so everyone is a partner in efforts to achieve a sustainable future. The Township Manager will work with township staff, Meridian Township Energy Team, Environmental Commission, Transportation Commission, and other township boards and commissions to define responsibilities for implementing the plan. The Plan should be revisited at least at 5 year intervals and updated as needed.

Sustainability Plan, Programs, Policies, and Progress to Date

a. Energy Efficiency

Meridian residents spend over \$100,000,000 each year on energy.³ The majority of this, consisting of non-renewable coal, oil, and natural gas, is imported from outside of Michigan. Most energy efficiency investments are dollars spent in our community and they have a multiplier effect. A 2011 report on the “Economic Impacts of PA 295 Energy Optimization Investments in Michigan” indicated that for each dollar spent on energy efficiency there is a net increase of over seven dollars in the cumulative Gross State Product (GSP).

Past and Current Energy Efficiency Efforts:

Energy efficiency remains one of the quickest and most economical paths to sustainability and resilience. Meridian government has made great strides in reducing energy consumption in its operations, saving over \$100,000 during the past 5 years. These energy improvements have more than paid for themselves and a portion of this savings has been allocated to a Revolving Energy Fund to support new investments in efficiency.

A “Phase II” Energy Study was completed in 2015⁴ (<http://bit.ly/phase-II>). In addition to seeking bids on the items recommended in this report, an engineering study is underway to explore major HVAC (heating, ventilating, & air conditioning) system replacements and/or retrofits for the Municipal Building. A recent benchmarking study by Consumers Energy shows we still have energy savings potential in our Township buildings⁵. (see Figure 3 and <http://bit.ly/energy-performance-17>).

³ <http://energy.gov/articles/how-much-do-you-spend> downloaded 9-12-16

⁴ Meridian Township Phase II Energy Efficiency Project - Part 1 Final Report submitted by Bob Tinker, RA, LEED AP, May 18, 2015

⁵ Consumers Energy Building Performance with Energy Star®: Energy Efficiency Walk Through and Behavioral Assessment Report submitted by Consumers Energy, May 2017

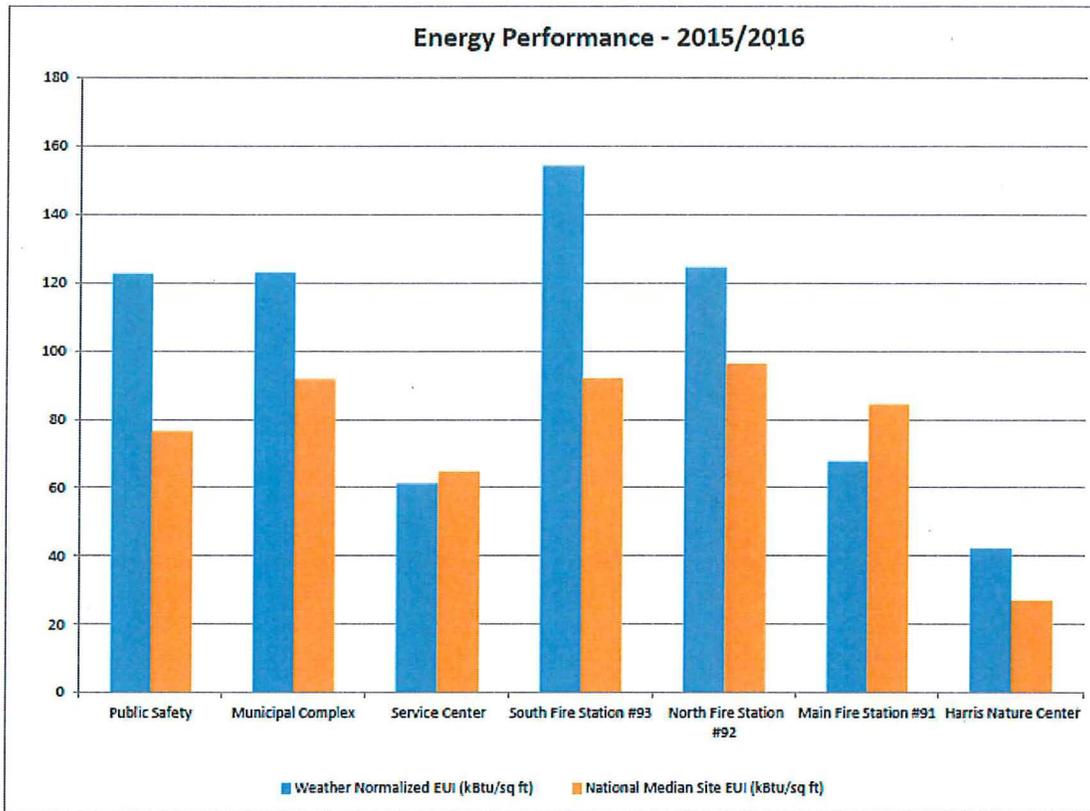


Figure 3 [How Meridian's Top-Consuming Buildings Compare to National Median](#)

Objective a.1: Achieve significant energy cost savings and carbon emission reductions in Township facilities.

Strategies:

1. Implement recommendations from the Consumers Energy [Building Performance with Energy Star Study](#) including development and adoption of a Meridian Energy Policy.
2. Implement [Phase II Energy Recommendations](#) and HVAC Engineering Study and include major HVAC upgrades in Capital Improvement Plans.
3. Obtain Energy Star designation for township buildings where possible.
4. Use LEED Gold criteria or the equivalent for all projects undertaken by the Township. LEED criteria include measures related to energy efficiency, renewable energy, recycling and waste management, transportation, and water management.
5. Monitor energy savings and return 80% of savings to Revolving Energy Fund.
6. Budget funds for energy efficiency assessments a minimum of once every five years.
7. Address sustainability implications in proposals for capital improvements. Township Manager will consider criteria related to energy efficiency, renewable energy, waste management, transportation, and water management when developing a capital improvement plan.

Objective a.2: Explore other opportunities and partnerships to achieve energy savings.

Strategies:

1. Identify and pursue State and Federal grant funding, pilot programs, and utility programs.
2. Further build partnerships such as Michigan Green Community Network, Clean Cities, Sustainability Forums, and expand collaboration with other local governments in our region.
3. Establish incentives to builders to exceed the energy efficiency provisions of the state building code.
4. Increase tree canopy throughout the township and especially in business areas to reduce cooling loads. Consider the potential for future solar energy installations when deciding placement of trees. Propose ordinance changes and provide incentives for existing businesses to upgrade their parking lots and landscaping to increase tree cover and shade to be energy efficient and environmentally friendly.
5. Create incentives for the use of white roofs or green roofs to reduce cooling loads.
6. Identify opportunities and remove barriers to support the construction of "tiny houses."
7. Review parking requirements and provide incentives to reduce and remove asphalt.

Objective a.3: Provide educational opportunities for Township staff and residents about energy consumption, energy savings opportunities, and utility incentives.

Strategies:

1. Improve delivery of information and data on energy consumption to building managers, Township staff, accounting/budgeting staff, and financial managers.
2. Provide Information to Township residents so they are aware of Township efforts and utility and other programs that can assist them.

b. Renewable Energy

Renewable energy systems are becoming more cost effective as technology advances lead to increased efficiencies and system cost decreases, while the cost of traditional power sources increase. Meridian Township will develop and identify opportunities to install solar, wind, geothermal, and other renewable energy systems at Township facilities and to facilitate installations elsewhere. The focus will be on solar energy in the near term because many opportunities exist.

Past and Current Renewable Energy Efforts:

Meridian Township adopted a wind energy ordinance in May 2011 (Ord. No. 2011-05) to provide standards and regulations pertaining to the location, construction, design, maintenance, and abandonment of wind energy systems and anemometer towers.

The Township worked with Peninsula Solar, Michigan Energy Options, U.S. Dept. of Energy, and Consumers Energy to create a solar demonstration and educational project at Harris Nature Center. The demonstration includes a solar-powered webcam system and a grid-connected photovoltaic (PV)

system. The main panels are mounted on a racking system on the roof (right photo) and a micro-inverter rests behind each panel. The two 250 watt roof-mounted solar panels were made in Michigan by Global Watt. These provide an average of 1.76 kWh on a sunny day. A separate 135 watt PV panel (left photo) powers two webcams pointed at the bird-feeding area and hawk cage. Energy production can be viewed at https://enlighten.enphaseenergy.com/pv/public_systems/Uwam100679/overview



The Meridian Township Energy Team has been identifying opportunities to encourage more solar energy use in the Township. The Lansing Board of Water & Light (LBW&L) is developing a 300 kW Community Solar project in Burcham Park on the border of Meridian Township. Since the Township does not have LBWL street lighting accounts, the Township Board authorized leasing ten 300 watt solar panels at the Burcham Park PV array. The Township will get utility bill credits for 25 years based on the electric production from the leased solar panels.

Objective b.1: Develop Township policies and procedures that encourage the use of renewable energy.

Strategies

1. Revise Township ordinances and procedures to ensure that they encourage energy conservation and the use of renewable energy.
2. Develop renewable energy and other practices that reduce greenhouse gas emissions that can be included in the list of amenities allowed in mixed use and commercial planned unit developments (PUDs).

Objective b.2: Increase the use of renewable energy at Township facilities.

Strategies

1. Obtain 50% of Township electricity from renewable energy by 2025 and 100% by 2035. The Township receives almost all of its electricity from Consumers Energy and indirectly will get 15% of its electricity from renewables due to the state Renewable Portfolio Standard (RPS) requiring the 15%.
2. Pursue the installation of solar electric systems at Township facilities by Dec. 31 2018. Identify and evaluate options to fund solar energy installations on Township facilities.
3. Participate in Community Solar or other green purchasing programs where possible.
4. Identify and seek grant funding for demonstrations of new renewable energy technologies.
5. Identify opportunities for non-grid connected applications like solar street lighting and solar lighting for signs.
6. Explore benefits and costs of using a solar electric system as backup power for Township buildings.

Objective b.3: Provide educational opportunities regarding renewable energy options and encourage the installation of renewable energy at private and public facilities throughout the Township.

Strategies

1. Obtain 25% of total community electric use from renewable energy resources by 2025. This includes the 15% due to Michigan’s Renewable Portfolio Standard (RPS) requirements.
2. Provide educational opportunities on current and proposed policies, programs and incentives that could help Township residents, businesses, and institutions utilize renewable energy.
3. Share information about funding and vendors with residents and business owners.
4. Provide incentives to developers to employ renewable energy in site plan and construction of new development. Identify and adopt incentives to encourage greater use of renewable energy, e.g. incentives for net zero homes or PV systems, elimination of permit fees for PV systems.
5. Collaborate with schools and other institutions on joint purchasing of renewable energy systems.
6. Inventory, highlight, and promote Meridian homes and businesses that feature net-zero, renewable, LEED, and related features.
- 7.

c. Recycling and Waste Reduction

Recycling is an important environmental action taken by most Meridian Township residents and businesses. Recycling saves resources, prevents pollution, supports public health, and creates jobs. Harmful chemicals and greenhouse gasses are released from rubbish in landfill sites. It takes less energy to create new items from recycled materials than it does to create new products from raw materials.

Past and Current Recycling and Waste Reduction Efforts

For over a decade Meridian Township has partnered with citizen groups and waste haulers and recycling providers to provide recycling options to residents. During this time, Meridian has offered drop-off for yard waste, paper, metal, glass, and #1-#2 plastic at its Recycling Center and Transfer Station at 5976 E. Lake Drive in Haslett. This has been expanded to include electronics, Styrofoam/expanded polystyrene, green glass, and batteries. In addition, useable household furniture and knick-knacks are often reclaimed and refinished for resale.

In 2005, Granger, who serves the majority of single-family residential customers in the Township, began providing curbside recycling at no charge to their customers in 1-5 unit

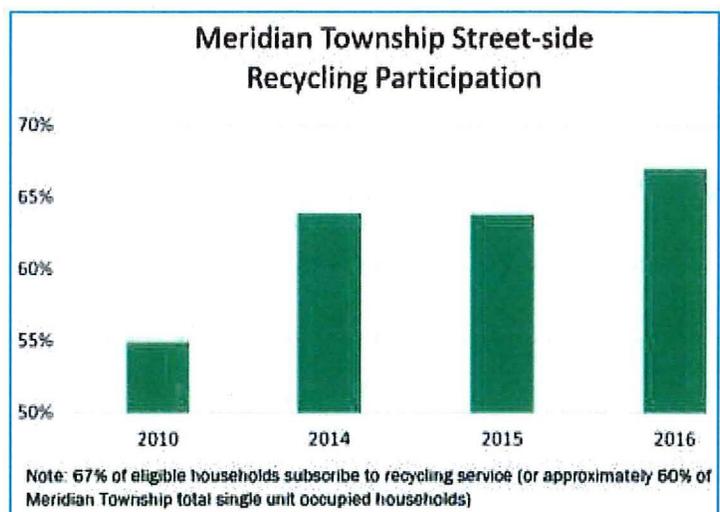


Figure 4 [Granger 2016 Recycling Report](#)

single-family dwellings. Also, in 2006, the Meridian Township Citizen's Recycling Advisory Committee formed and offered the first bi-annual community-wide recycling day. In 2007, Meridian hired a Recycling Coordinator to assist with recycling efforts in the township. Figure 4 illustrates increases in curbside recycling rates during the past six years.

In 2015, larger residential recycling carts were offered, which helped increase recycling rates in the residential sector in 2016. In addition, more materials were collected at our drop off center.

Objective c.1: Increase recycling in owner-occupied dwelling units. Reduce the amount of materials sent to landfills by 10% in 5 years.

Strategies

1. Work with Granger and others to expand the use of 96 gallon carts and remove disincentives for recycling.
2. Evaluate having a single hauler in the township.
3. Launch a collaborative marketing and outreach program in the Township to promote existing recycling services and options.
4. Conduct regional education and promotion opportunities in collaboration with the Regional Recycling Coordinating Committee (R2C2), Capital Area Local First (CALF) and other neighborhoods, organizations, and partners.

Objective c.2: Expand recycling in multi-family housing, township departments, and in other commercial settings. Reduce the amount of materials sent to landfills by 10% in 5 years.

Strategies

1. Promote and expand current recycling efforts in multi-family housing.
2. Revise ordinances and policies as necessary to encourage recycling.
3. Provide technical assistance to managers and occupants of multi-family housing/apartments.
4. Implement a recycling campaign for all township departments.

Objective c.3: Offer community- and region-wide recycling events and other partnerships

Strategies

1. Partner with local business, schools, neighborhoods, governments, churches, and others to promote and offer recycling events.
2. Promote Ingham County household hazardous waste collections.
3. Explore collaborative processing and/or transfer of recyclables locally and/or in the region.
4. Identify and implement food, cooking oil/grease, composting, and related organic material recycling options.
5. Provide educational opportunities concerning the 5 R's: Refuse, Reduce, Reuse, Repurpose, & Recycle.
6. Consider a ban on plastic bags for single use purposes. Promote re-usable bags, bottles, etc.

d. Transportation

Transportation produced 26% of greenhouse gases in 2014⁶. Public and non-motorized alternatives can reduce the impacts from these greenhouse gases. The most accessible alternative to petroleum is often overlooked -- walking and biking. Transportation fuel use reduction measures decrease emissions, save the Township and residents money, enhance environmental quality, and promote public health. The Township will focus on its own fleet, walking and biking, and land use decisions. Land use decisions that lead to infill development and a greater use of public and non-motorized transportation can significantly impact petroleum use.

Past and Current Efforts:

A Complete Streets Ordinance was adopted by the Meridian Township Board on Sept. 18, 2012. The ordinance is intended to provide safe, convenient, and comfortable routes for multiple modes of transportation including but not limited to walking, bicycling, personal vehicles and public transportation.

The Township has 20 miles of trails and 80 miles of pedestrian/bicycle paths. The development and maintenance of the trails and pathways are funded through the Park Millage and Pedestrian/Bicycle Pathway Millage. They are maintained by Township Parks and Grounds Maintenance Staff. The purpose of the pedestrian/bicycle pathway system is to provide a network of interconnected pathways throughout Meridian Township that connect destination points including schools; libraries; parks; public buildings; commercial areas; and connecting routes outside the Township.

Smart Commute competitions, coordinated by the Mid-Michigan Environmental Action Council, encourage trips involving alternatives to single-occupancy motor vehicles. Meridian Township staff has participated in the competitions for a number of years and in 2015 placed first among 23 teams participating. The 34-member Primed Meridian team won with 1,083 smart commutes, up from the previous year when the team had 927 trips. The Township has also offered bikes and bike helmets to employees and volunteers for the past three years.

The Meridian Energy Team partnered with the Greater Lansing Area Clean Cities Coalition and ChargePoint to purchase and install an electric vehicle charging station at Studio C in 2012. The Township has also explored clean diesel technology and experimented with biodiesel in its vehicles.

The Meridian Transportation Commission began meeting in January 2017. The purpose of the commission is to review transportation services, both public and private, within the township as to their efficiency, sufficiency, and costs and make recommendations, if necessary, for improvements.



⁶ Fast Facts on Transportation Greenhouse Gas Emissions, U.S. Environmental Protection Agency, December 1, 2016

Objective d.1: Encourage employee and citizen participation in Smart Commute competitions and encourage Township employees and citizens to be smart commuters year round.

Strategies

1. Continue to expand the bike and pedestrian pathways network throughout the Township.
2. Incentivize employee participation in Clean Commute competitions and encourage employees to be smart commuters year round.
3. Partner with Capital Area Transportation Authority and others to promote "Clean Commute" options and identify efficient paratransit and Redi-Ride efficiency improvements.

Objective d.2: Decrease the use of petroleum in the Township vehicle fleet.

Strategies

1. Choose the cleanest and most fuel-efficient vehicle that meets the department's needs.
2. Use electric or hybrid vehicles whenever possible.
3. Use efficient trip-planning to reduce the use of fuel.
4. Conduct an efficiency inventory and audit of the Township vehicle fleet.
5. Adopt a fuel efficiency target for the Township vehicle fleet, including an implementation plan for reaching this target. The plan should incorporate vehicle efficiency and life cycle cost analysis as well as highlight opportunities for purchasing or converting vehicles to be more efficient.
6. Review and update the idling policy for the government fleet and/or a community-wide policy.
7. Identify and seek funding for alternative fuel vehicles and electric charging infrastructure.

Objective d.3: Use land-use planning to reduce vehicle miles traveled and petroleum use.

Strategies

1. Accelerate implementation of the Township's Complete Streets policy to ensure that entire roadways are designed and operated with all users in mind - including bicyclists, public transportation vehicles and riders, and pedestrians of all ages and abilities.
2. Use the Urban Services Boundary to reduce vehicle miles traveled and encourage infill and redevelopment.
3. Encourage cluster developments, mixed use and other compact residential choices closer to shopping, public transit and other services.
4. Offer fast tracking and technical assistance for sustainable developments.

Objective d.4: Provide educational opportunities on transportation alternatives that can reduce petroleum use.

Strategies

1. Provide educational opportunities concerning public transit, car sharing, smart commuting, and transportation-efficient communities.
2. Provide educational opportunities on biking, walking, and driving safely, especially around bikers

- and walkers.
3. Continue membership in and partnerships with Greater Lansing Area Clean Cities (<http://michigancleancities.org>) and providers of efficient vehicles, equipment, and fuels.
 4. Provide web sites and apps that identify charging stations for electric vehicles. Identify funding and opportunities for electric car charging stations.
 5. Promote the employee and volunteer bike-sharing program.

e. Water Management

Water and how it is managed impacts almost all aspects of society, in particular health, food production, water supply and sanitation, and the functioning of ecosystems. Higher temperatures and changes in extreme weather conditions due to climate change are projected to affect rainfall, river flows groundwater, and water quality. Water management is an important Township responsibility and pollution prevention and wetland preservation are priorities. One of the most significant Climate Change impacts in Meridian Township will be more major rain events that lead to flooding.



Drinking water and wastewater systems account for approximately 2 percent of energy use in the United States, adding over 45 million tons of greenhouse gases annually. As much as 40 percent of operating costs for drinking water systems can be for energy.⁷

Past and Current Water Management Efforts:

Meridian Township Public Works and Engineering maintains, repairs and operates the water distribution system; which includes 158 miles of water mains, 12,000+ water services, 15,000+ water meters, over 15,000 remote readers, over 1,900 fire hydrants, and two 500,000 gallon elevated storage tanks. The Township's web site has information on storm water management and pollution prevention including the following topics: Pollution Isn't Pretty, How to Properly Wash Pavement and Your Car, Pesticides and Fertilizers, Green Infrastructure and Low Impact Development, and Managing Riparian Lands.

The Township is a member of the East Lansing Meridian Water & Sewer Authority and purchases treated water from the Authority for areas of the Township north of Bennett Road and Kinawa Dr. The Township purchases treated water from the Lansing Board of Water & Light for areas south of Bennett Road and Kinawa Dr.

⁷ Sustainable Water Infrastructure: Energy Efficiency for Water Utilities, U.S. Environmental Protection Agency, April 24, 2017

The Township enacted a wetlands protection ordinance that is more protective of wetlands than State regulations. The Township ordinance stipulating “no net loss” of wetlands means that wetlands drained or filled must be replaced by a wetland of equal or greater size. This includes wetlands as small as .25 acres. The Township maintains a wetland inventory and incorporates wetlands considerations into the site plan review process, including setbacks from natural features such as wetlands.

Objective e.1: Decrease water usage at Township facilities.

Strategies

1. Use building audits to determine which water fixtures to upgrade.
2. Amend purchasing policy to require that when purchasing or replacing new toilets only low flow fixtures will be purchased.
3. Install waterless urinals where appropriate.
4. Implement, as funds allow, a system to capture and use rainwater and gray water for turf and landscape irrigation at municipal facilities.

Objective e.2: Reduce storm water runoff.

Strategies

1. Partner with the Ingham County Drain Commissioner on reduction in storm water runoff.
2. Review and change policies as needed to accommodate expected changes in storm surges and extreme weather events.
3. Increase the number of street trees.
4. Use porous pavement, rain gardens, bioswales, riparian buffers, and retention ponds as appropriate. Use township parks and other properties to demonstrate these strategies.
5. Provide credits on water bills for rain barrels, porous pavement, and rain gardens.
6. Encourage projects that reuse storm water for irrigation purposes.
7. Discourage development within wetlands, floodplains, floodplain fringe areas, and water retention areas. Strengthen the Township wetlands ordinance in order to increase wetland acreage in the Township.

Objective e.3: Provide educational opportunities concerning water conservation and management.

Strategies

1. Use signs, brochures, and other outreach materials to describe why we conserve water and what the Township is doing to conserve water, alternatives to fertilizer use and how it affects stream ecosystems, drought resistant grasses, native plants, rain barrels, water efficient appliances such as low-flow toilets, and how one’s water usage compares to a typical home’s water usage.
2. Use media, web page, HOM-TV, public forums, and other means to encourage water conservation.

Objective e.4: Explore opportunities for water efficiency improvements within Meridian's water supply and sewage treatment systems.

Strategies

1. Work with East Lansing Sewage Treatment Plant and Lansing Board of Water and Light to identify ways to reduce water use and sewage.
2. As a member of the East Lansing Meridian Water & Sewer Authority, identify ways to reduce water use.
3. Review water safety and supply plans and strategies.

f. Monitoring and Evaluation

Objective f. 1: Monitor greenhouse gas reductions and energy and cost savings and determine benefits to the community.

Strategies

1. Conduct a greenhouse gas inventory of the Township government operations.
2. An annual progress report will be prepared by township management on activities related to the Climate Sustainability Plan.
3. Evaluate cost-effective energy monitoring systems, software, assistance, and equipment including WeGoWise and Consumers Municipal Energy Efficiency Pilot and invest in monitoring equipment as needed
4. Prioritize top energy-using sites, buildings, and equipment for more frequent monitoring.
5. Explore opportunities with Consumers' E-Billing Program, smart metering, street lighting, and other pilot programs.
6. Calculate annual water, energy, and cost savings and reductions in greenhouse gases. Reporting metrics would make annual comparisons and include:
 - 1) Annual greenhouse gas reductions for municipal operations and the community (tons)
 - 2) Annual municipal and community energy consumption (MBTU)
 - 3) Annual energy and cost savings from energy improvements to municipal buildings (MBTU, \$)
 - 4) Annual renewable energy generated from township facilities or purchases (kWh)
 - 5) Annual renewable energy generation in the community (kWh)
 - 6) Materials recycled communitywide (tons)
 - 7) Number of participants recycling (#residents, #businesses)
 - 8) Annual municipal water consumption (gallons)
 - 9) Annual community water consumption (gallons)
 - 10) Number of electric, electric hybrid, or alternative fuel vehicles in the township fleet
 - 11) Annual fuel savings in the township fleet (gallons of petroleum-based fuel)
 - 12) Percent sustainable commutes by mode type (%walked, %biked, % public transportation)
7. Objectives and strategies in this plan should be revisited every 5 years and a summary of accomplishments prepared.

Conclusion

This Climate Sustainability Plan for Meridian Township documents activities implemented by the Township since the Township's signing of the U.S. Mayors Climate Protection Agreement in 2007. Much progress has been made and the Township's departments and residents can be proud of the efforts to date. The Meridian Township Board adopted a resolution of support for the Paris Climate Accord on June 20, 2017. Implementation of this plan will support the Paris Climate Accord and enable Meridian Township to:

- Contribute to the worldwide efforts to curb greenhouse gas emissions.
- Make our community a more sustainable, resilient, affordable, and vibrant place to live.
- Make our township government operations more energy and resource efficient and better prepared to deal with the impacts of climate change.

Acknowledgements

Many organizations and citizens assisted in the development of this plan by providing presentations on climate change topics, comments on plan drafts, and suggestions for objectives and strategies.

- City of East Lansing
- Great Lakes Integrated Sciences & Assessments
- Consumers Energy
- Ingham County Drain Commission
- Meridian Economic Development Corp.
- Meridian Energy Team
- Meridian Environmental Commission
- Meridian Planning Commission
- Meridian Transportation Commission
- Michigan Climate & Health Adaptation Program, MDHHS
- Michigan Green Communities Network
- Michigan State Climatologist's Office

Cover Photo Credit: Todd Miner, Penn State University, 1996

Figure 1: Great Lakes Integrated Sciences & Assessments (GLISA)-Climate Change and Health Impacts presentation by Lorri Cameron, MPH, PhD to Environmental Commission on Feb. 1, 2017

Figure 2: Michigan Climate and Health Adaptation Program- Climate Change and Health Impacts presentation by Lorri Cameron, MPH, PhD to Environmental Commission on Feb. 1, 2017

Figure 3: Consumers Energy Building Performance Study (2017) <http://bit.ly/energy-performance-17>

Figure 4: [Granger 2016 Recycling Report](#)